DOCUMENT RESUME

ED 435 436 PS 027 833

AUTHOR	Samuelsson, Ingrid Pramling, Ed.
TITLE	Our World?
PUB DATE	1998-00-00
NOTE	125p.
AVAILABLE FROM	Lisbetth Soderberg, Goteborg University, Department of Education, Box 300, SE-405 30, Goteborg, Sweden. E-mail: Lisbetth.Soderberg@ped.gu.se
PUB TYPE	Books (010) -- Collected Works - General (020)
EDRS PRICE	MF01/PC05 Plus Postage.
DESCRIPTORS	*Conservation (Environment); Curriculum Development; *Early Childhood Education; Ecological Factors; *Ecology; *Environment; *Environmental Education; Foreign Countries; Preschool Education; Water; Water Pollution; Water Quality
IDENTIFIERS	Denmark; Earth; *Ecological Perspective; *Environmental Awareness; Finland; Iceland; Nature; Nature Study; Norway; Sweden

ABSTRACT

Authored by individuals from five Nordic countries, this book focuses on questions about the child's right to live in and learn about an ecologically sustainable world. The first five chapters are theoretical in character, while the final six chapters are derived from work done by early childhood teachers together with children. The goal of the book is to contribute to teacher's knowledge base and also to give some inspiration for new approaches in everyday work with children. Following a brief preface, 11 individual essays are presented: (1) "Wondering--Understanding--Change" (Stefan Edman); (2) "Rio, Iceland and the Child--Environmental Issues and Education in Iceland" (Thor Jakobsson); (3) "Can Children Learning To Protect the Natural Environment, Profit from the Wisdom of Indigenous Peoples?" (Per-Olav Tiller); (4) "Environmental Co-Operation between Children, Adults and Authorities" (Kaija Kess); (5) "This Is, After All, The Water Planet!" (Anne Lea and Inger Hilmo); (6) "Water--Environmental Education for Preschool Children" (Hrafnhildur Sigurdardottir); (7) "The Best Way for the Child To Learn Is by Doing" (Paivi Romppainen); (8) "Learning about Different Aspects of the World Around Us in a Theme of Nature" (Ingrid Pramling Samuelsson and Ann-Charlotte Mardsjo); (9) "Making Children Aware of the Wonders of Nature" (Liselotte Johansson); (10) "You Have To Act To Make Changes" (Erik Thalling); and (11) "Children and Fire" (Karen Vilien). (SD)

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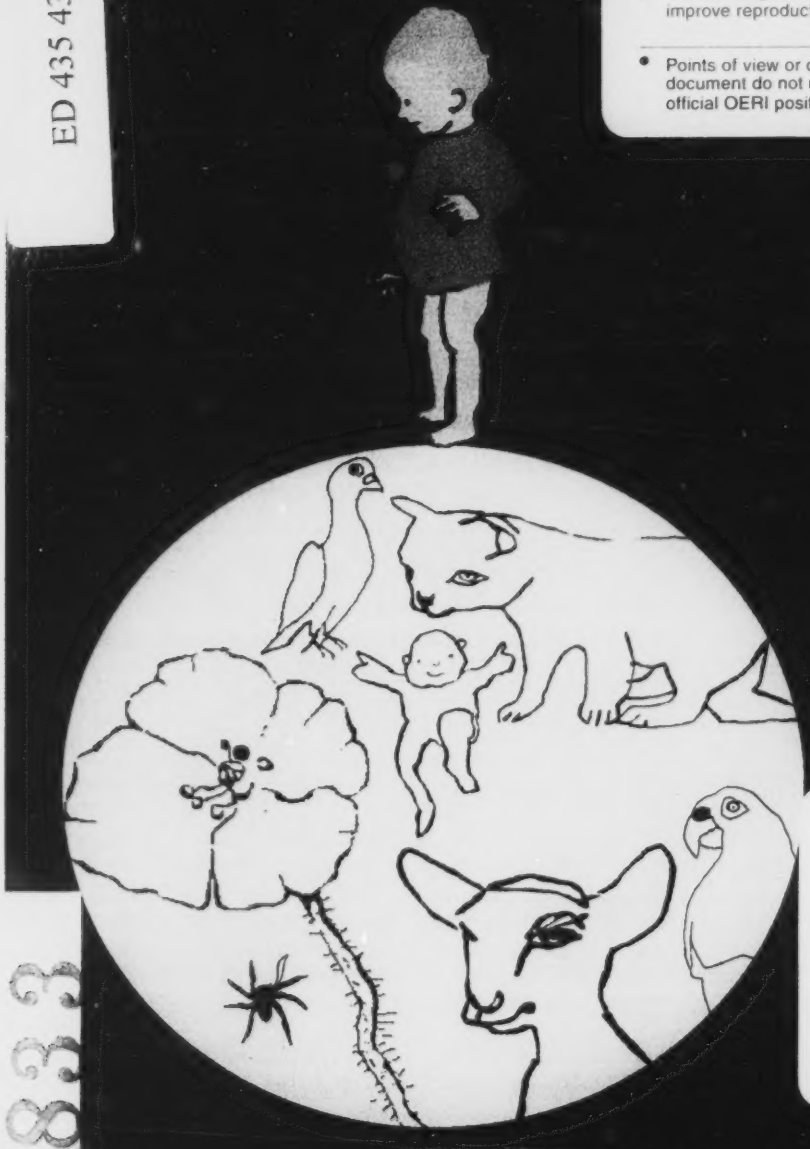

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Photos and illustrations: Collected from day-care centres in the Nordic Counties

Printed by Elanders Tofters, Östervåla, 1998

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Preface

When the Nordic committees of OMEP planned the World Congress in 1998, we asked ourselves, "What is special with Nordic early childhood education?" We then thought that outdoor activities are something which have a long and solid base in our countries. Something which people in countries with a milder climate might not be aware. It is easy to take for granted that in a climate like ours, with quite cold days more than half of the year, children would spend most time indoors. But they don't! Maybe because people in the Nordic countries, to a large extent, are devoted to and love spending their leisure time with nature. We also think there is quite a high awareness of the fact that we need to take responsibilities for having a sustainable world. Many children grow up in families and environment where all the garbage is sorted into different boxes as part of everyday life. And they also grow up surrounded with a constant dialogue about environment and nature.

The present book is a joint project between people from the five Nordic countries. Every OMEP committee asked their own authors to contribute with chapters. The book ended up with ten chapters of which four are of a more theoretical character, and the others examples from work done by teachers together with children.

To be able to influence children's attitudes as well as developing their awareness of nature and how to live in a sustainable world, the teachers must have adopted an attitude saying that "our globe is our life" and also gained knowledge as a base for their work.

Our hope with this book is that it should contribute both to teachers knowledge base and also give some inspiration for new approaches in everyday work with children.

We are aware that this book in a way is very Nordic since the examples are from our early childhood education programmes. But at the same time we have full confidence in people coming from other parts of the world to be able to ask themselves, "How can I transfer the Nordic work to my own surroundings and my own group of children?"

Göteborg, 1 May 1998
Ingrid Pramling Samuelsson

WONDERING – UNDERSTANDING – CHANGE

Biologist Stefan Edman

We are facing enormous challenges. Mother Earth is not well, we know that very well. Life is threatened because we, the human beings, during very few decades have affected the original rhythm of Mother Earth herself. But it is not too late. There is still time to change.

But in order to have strength enough to participate in the change we have to keep our love for Mother Earth and for Life burning and take the chance to enjoy the beauty of nature, and getting an appetite for life when realizing how everything is tied together. Bear in mind the golden rule of nature: All good that we want nature to do to us, we must do for nature.

We, the human beings, are a weave in the body of the earth. We are totally dependent on a swarm of other living organisms: green algae, trees, germs of the mould. Without them we would not exist. Their biological power makes the cells develop and are kept living in lungs, kidneys, liver, heart and brain. If we poison the water, the air, the land, we poison our own blood. Or the opposite way: When we love and care for the worm by refraining from poisoning the soil, then we promote our own lives.

Without the air from the green ones
you don't stand a chance!

Perhaps it is one of these wonderful summer days today! No clouds, light blue heaven. Perfume from dark purple roses. Birds twitter. Maybe you lie on the soft grass, warm in your body, happy when looking up into the sky?

Did you ever think about the fact that you are surrounded by a sea, invisible, clear as glass, light as a feather? Only when the light summer breeze sweeps through your hair you feel it. The air!

The air is a warming cover over a planet which otherwise would be as unfriendly for life as the neighbours Mars and Venus. The atmosphere of the earth is a complicated, but unique and beautiful

mixture of pollutions with different qualities. Carbon dioxide forms a natural "greenhouseglass". The radiation of heat stays in a way that the average temperature of the earth becomes perfectly suitable for the life of human beings, around +14 degrees Celsius. The ozone layer forms the very thin "glory" at a height of 30-40 kilometres around the globe. This protects the living creatures from the major parts of the cosmic radiation that otherwise would damage or even kill them.

The water in the air forms a subtle regulator both for the heat- and water balance in our world. But the air is more remarkable than that. Have you ever thought of the fact that it is through the air that you can see, hear and smell? The air is the medium for most of our sense experiences and for our communication with the surrounding world. The tiny parts of the air "swing" the sound from a singing bird. Sound originally is a movement in the air. A "swing" which later is brought to the drum-membranes, the bones and all fluids of our ear, in order for us to be able to hear.

Also through the air the freed molecules come sailing, e.g. from your wonderfully scented morning cup of tea or coffee to your cells of taste. The molecules carve their message, an electric signal runs from tongue and nose to the brain – and you praise the wonderful aroma of tea or coffee...

Through the air comes the molecule without which your heart would not beat at all. The oxygen! You lie on the grass, the blood flows through your body, every cell is part of the rhythm of the whole body. In the brain electric currents form the material base for such phenomenons which we may never be able to understand: the flight of the thought, the sudden leap of the fantasy and feeling, the inner library of experiences and memories...

And all this starts with the molecules of oxygen, which in billions dance into your body and in every cell free energy, power, from the food that you just had. The oxygen is not produced by human beings, it is created in the grass underneath you, up in the trees or out at sea, in the green heaps of algae. The oxygen was born as "pollution", "garbage" in the most remarkable of the planet's processes. photosynthesis.

Our lives do not start with the skin, they start in the trees. Or hundreds of kilometres from where you are. The green ones do not

need us, but we need them. We would not stand a chance without them. For this reason we ought to respect and care for them!

The air consequently is a wonderful element. Therefore it hurts to see mankind poisoning and destroying the air. And we realize that this more and more also negatively affects ourselves. Every year 50 million tons of sulphur and nitrogen dioxide are let out into the atmosphere from Western Europe, from chimneys and cars. These are gases which attack growing forests and fields and create bronchitis illnesses for hundreds of thousands of people, not least to children. But they are also freed in the rainwater and fall down into coastal seas, lakes, rivers and forests. The result is souring and overfertilizing. Big areas of forests, mostly in Eastern and Southern Europe, today suffer from poisoning, imbalance of food supply and lack of growth. Many trees are badly off. Lakes, especially in the Nordic countries, are threatened by souring which kills the fish and a variety of other species in the water. In the coastal seas there are during summer a strong growth of algae because the water is heavily fertilized. When the algae die and are broken down a serious lack of oxygen often occurs making life hard for fish embryos, mussels and other sea animals.

But the air is also filled with iron, lead, zinc, cadmium etc. and organic substances. When those reach the forests and the fields they interrupt the life processes and may later damage even us human beings. "Brother air", as Franciscus called it, can get healthier. But then we have to make sacrifices in our so called welfare, meaning our salaries, our "things", our status. This has to be done if we are also going to be able to save the other two elements, the water and the land. We ought to redefine what welfare is, because what is a good life without fresh water, fertile moulds and clean air? What is welfare without solidarity and security in a tender and responsible use of the creation?

Fascination and the sense of holiness for God's creation give us the inner joy and sovereign power to resist the over consumption. The experiences of nature are free of charge, from pure mercy. They are a part of lust for life and welfare that we can not afford to lose!

Care for sea and lake! – You carry them in your blood!
From the water we come and back to water we go. Have you thought of the fact that your own body is a lagoon, filled with water from the sea? One single glass of sweet juice from raspberries, one single cup of coffee after the swim – and you are letting the water molecules of the oceans flow into your body! The tap water at home comes from the water reservoir in your community, yes. But a week ago the drops of your coffee were out in the sea. The sun lifted them up, the wind pushed the rain clouds to land, to "your" lake. And now the water is on its way into your cells, your blood, to the protecting fluid that pours into your brain. A month ago this water belonged to a sea far away, a year ago it was floating in the Atlantic Ocean. The drops in your glass of juice, for millions of years have been "serving" thousands of other living creatures: the sharks of the seas, the seagulls of the coasts, the giant lizards of the continents and the forests of ferns. This is giving only a few examples.

You and I are enclosed in the ancient global circulation of water. The holy principle from the creator and the creation is reusing, economizing.

Your body does not start and end with your skin – it starts out in the sea! Water, "the blood of the creation" ties you in every moment together with your "sisters and brothers" in the tightly woven web of the planet earth. You are inseparately bound together with all of them through the water. The processes of life in heart and in brain every moment depend on water which once "was born" in the moment of creation a very long time ago. You grew, surrounded by the foetus water of your mother, a "bay" of the Atlantic Ocean.

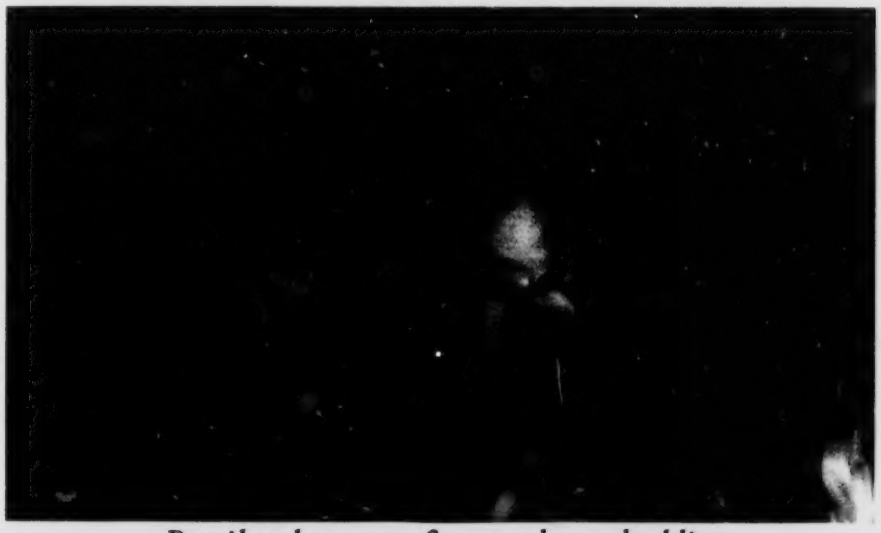
When we realise this connection we are filled with holy reverence of the Wisdom of the creation. And we feel the great Artist. We become happy, we enjoy life. But we also are hit by sorrow and anger over the destruction that mankind today does to lakes and seas. The basic elements are threatened and along with this, life on the earth as well and our own future as human beings.

Let us reflect for a while over the threats against water. But also over what we can and have to do in order to bring back health to coastal seas and to lakes. Most coastal seas for some decades suffer from overfertilizing. The fields are fertilized and leak out phosphorus. Also the households contribute. From the cars the

exhausts leak nitrogen oxides which later as rain falls into the seas. The result of this is a powerful "algae blooming" meaning a growth of green microscopic algae in the surface water of the seas. The problem occurs when all these organisms at late summer and autumn die and are broken down by the germs of the water. For this process oxygen is demanded in such a big amount that shallow bays and bottoms of rivers do not get enough oxygen – if anything at all. At this stage no animals can longer live in the water. Fish have problems with reproduction as their eggs don't mature in environments with little or no oxygen.

A serious threat towards lakes and rivers is the souring. It displaces the balance. The major reasons are the petroleum based heating and the buses, cars and trucks in road traffic. Coastal seas, lakes and rivers also suffer from other kinds of pollution. For example great amounts of organic chlorine substances are let out from the bleaching factories where paper is made shining white through bleaching. This creates acne, crooked backs, hormone disruptions and other damages to fish. Certain industries still produce dangerous doses of metals and organic substances such as cadmium, quicksilver, lead, arsenic.

But! even if the waters have become very damaged from the left overs of our welfare it is possible to make them recover. It is not too late. We have to act quickly, though.



Patrik takes care of a new-born duckling

Take care of the land – Your heart does not beat without the germs in the ground

How wonderful it is to take mould from the garden heated by the sun into you palm! Letting the grains of mould run between your fingers, smell the strong perfumes through your nose...

Did you know that your life literally starts down in soil? In fact this is easy to understand. You tear your sweet, juicy carrot, cultivated by yourself, to be served as a dish for your dinner. Vitamins, yes. But also sugar, which is fuel for the heart muscle and all the millions of continuously ongoing life processes in your body.

Your heart beats faithfully on the fuel from the carrot. And the carrot is a sun factory, which through lots of intelligently performed biochemical reactions have built up the sugar in its tissues. But nothing of this would be possible if the germs of the ground were not acting. Those are the ones that break down the dead substances in order to free new food substances of vital importance in the soil. Substances that the carrot absorbs and brings into its factory.

Your heart always beats thanks to the germs in the ground. And they are many – in one single palm of mould there can be as many as there are people on our planet Mother Earth! Four – five billions... Thank them for your life!

Our body does not start or end with the skin. It starts biologically out there in the ground of the garden. We are stunned and we wonder. We realise that all evil that we do to the ground and its inhabitants, we do to ourselves i.e. when we pour synthetic chemicals into the field in our garden. Or the other way around: all good that we do, with this we bless our own bodies. This is a paraphrase of the Sermon on the Mount. Naturally enough if you believe that the identical creator fostered not only man but also grains of dust!

Around the world there is serious damage of soil in fields and in forests going on. The fields of the planet in fact have the ability to feed not only the present population, but probably double the number of hungry people. There is enough land so far. But the ground then must be taken care of and distributed in a better and more fair way than today. This fact we all know.

In many countries the major part of the land used for cultivating is owned by a very few number of wealthy people, while too many

poor starving peasant families are forced to live off small, dry, sour or poor land. A solution for many non land owners in the tropical countries is to burn the huge rain forests. The devastation of tropical forests almost always starts by large companies who want exclusive furniture-wood for the wealthy market in USA and Europe. Then the farmers come and burn the rests of their forests hoping to be able to cultivate their food for some years in the ashes. Other areas of the world are so intensely used by farming that the land is wasted by soaking or salting. Some countries are grazed by sheep and goats and there, steppe and desert are increasing at a dangerous speed. The original problems very often are poverty and injustice.

But also in Europe and USA there are problems. As we know the forests are subjected to wetting and poisonous metal soaking, processes that more and more damage the growing forest. Especially this crisis is serious in Eastern Europe and in Russia sending out sulphur smoke from industries and heat works.

Emission of nitrogen from coal stoves and cars play a vital role in the environmental destruction in the industrialized countries. The nitrogen oxides both makes sour and fertilizes, both ground and water.

The use of chemicals also is a problem, especially in the developing part of the world where huge amounts of often very dangerous substances are being used. But also in Europe substances are used that are at risk of staying in the soil and nearby rivers and lakes.

What to do?

Out of the UN-conference of 1992 in Rio the Agenda 21 was created, with many hopes and promises to start working for the protection of the global environment and to work for a sustainable global development. The Agenda 21 says that it must be possible to live on the Earth in a hundred or in a thousand years. For this reason the existing classical market economy must be changed and adapted to what nature can endure. And many good things have happened, many good projects have started all over the world.

But the main problem is and will continue to be the preposterous distorted allotment in trading and economy between industrialized countries and the nations of the developing countries. The environmental crisis of the industrialized countries depends on too

high a growth and of the developing countries on lack of economical growth and development. This is a major starting-point in Agenda 21.

For this reason the environment question in its deepest sense is a question of ethics, morals and justice. Swedish people for instance have to open up the frontiers to products from developing countries in a better way. Trading policies have to become more just. Aid money should in the future, to a larger extent be for land and water projects in the countryside of the developing countries that are getting support.

When considering the problem of overfertilizing there are both possibilities and plans to cultivate grass and clover as examples in former fields of corn close to rivers, lakes and coasts. Such a "greensward" is an efficient "nitrogen trap" that stops much of the food substances which otherwise would fall into the water and start the algae blooming. In Sweden since 1990 e.g. 500.000 hectares of corn fields are to be changed into such greensward.

The greensward can be harvested and either used for heating in heat works or reprocessed into biogas for fuel to cars and buses. In the longer perspective it is a pro-environmental alternative to petrol as the carbon dioxide that is created goes back into growing crops instead of contributing to the warming up of our planet.

Great amounts of substances as you recall derive from the emissions from cars and goes into the waters. In western European countries about two thirds of the nitrogen oxides originates from road traffic. Catalytic cleaning of cars diminishes this affect on the water environment. But at the same time the number of cars increase. So it is important that more passengers and more of the goods are transported by buses and trains in order for the damage of the road traffic to seas and lakes can really be lessened.

The speed on the roads as well plays an important role. On the road the emissions of nitrogen oxides diminish by half if the speed is reduced from 110 kilometres per hour to 80 kilometers per hour.

With the new, unbleached or oxygen bleached papers organic chlorine substances have diminished considerably and the consumers are very satisfied. But more can be done. All chlorine bleached paper articles ought to vanish completely from the market rapidly.

About quicksilver? Both the batteries and the amalgam that the dentists use play the biggest role in combination with pollution coming from far away.

Our own lifestyle will either deteriorate or improve the health of the land and the soils.

All environmental problems sooner or later end up in our own kitchen, in our own lifestyle. Radical decisions for the environment have to be taken. A task for every citizen is:

- Write to the newspapers!
- Call your local politician!
- Go to meetings!
- Take part in or arrange demonstrations!
- Start talking about the environmental problems at your work-place, in day care, in school, at home within your own family!

The environmental battle starts in our own pantry!:

- Try to buy non syringed vegetables and potatoes. Look for products with the special environment markings on.
- Try to get the schools and day care centres of your community to buy non syringed vegetables and potatoes for their kitchen. If possible through contact with local farmers.
- Try a similar action at your work.
- Cultivate non syringed vegetables yourself. There are many good books on the subject.
- Decrease your consumption of coffee and tea, products from farms of countries which ought to use a greater share of their land for domestic production instead of products of enjoyment for us westerners. Coffee from the shops of developing countries is often cultivated on other kinds of land.
- Protest against all unnecessary plastic packages and bring your own bag.
- Don't buy furniture from tropical woods such as teak, mahogany.
- Take part in rain forest actions.
- Take the train as often as you can. Or the bike.
- When you drive a car – don't drive faster than 80-90 kilometres per hour. This diminishes your share of souring and fertilizing substances that damage the environment.

Practical things that can be done to save the waters:

- Always buy unbleached or oxygen bleached toilet- and household paper! There are many kinds in most stores. Check the situation at your work, get rid of the chlorine bleached and present environmentally good paper in every pantry, in every toilet. And get paper favourable to the environment as well for the typewriter, the computer, the letters that you write.
- Always buy detergent with very little phosphorus for your dishwasher and your washing machine. Most of them carry a special marking saying that it is favourable for the environment (which differs in various countries, though the Swan marking exists in many European countries). With this you contribute to make the lakes in your neighbourhood cleaner and fish and other small animals get a better life.
- Always use batteries free from quicksilver. And if you have used a battery with quicksilver, always leave it for collection.
- Ask for delivery stations for news-papers, for metals, for plastic, for bottles, for tins.

As you see as private citizens we can do quite a lot in order to decrease the dangers to our land and waters. We have many possibilities to prevent environmental demolition. Let us take them!

Remember the three very important words: Wondering – Understanding – Change. *Wondering* gives us an appetite on knowing more and starting to understand. And she/he who *understands* how beautiful life on Mother Earth can be, but how bad she feels at this present state, will be wanting to take part in the *change*. Warm hearts and clear thoughts are needed! Feeling and knowledge! Inspiration and empathy!

RIO, ICELAND AND THE CHILD – ENVIRONMENTAL ISSUES AND EDUCATION IN ICELAND

Dr Thor Jakobsson

The idea of an ecological sustainable world has developed rapidly during the last decades. Narrow specialities in geophysics have been widened and connected in order to be able to study the whole Earth with its atmosphere, oceans, continents, vegetation and animal kingdom. Scientists in fields like oceanography, meteorology, climatology, glaciology, geology, geography and biology have joined forces and now work together on complicated riddles of nature.

Even though the specialized fields in science still have their important role to play and will always have, merging of sub fields or co-operation is needed in studying systems of intricate relations of many parts and features. This coupling of the sciences makes the base for the field of ecology, the branch of biology that deals with the environment of living organisms. Another such field is biometeorology which comprises the study of effects of various environments on living organisms, plants, animals and man.

Nature is both complicated and mighty and until recently activities of man have apparently not been of comparable vigour and dimensions as forces of nature. Now, man has discovered that this might not be so any more, taking all things together. Besides at times ruining nature on a limited scale, he might be having an impact on the global environment. Out of the worries concerning this possibility has come the conception of sustainable development in the world.

Rio 1992 – Agenda 21

In June 1992 the United Nations Conference on Environment and Development , "The Earth Summit", was held in Rio de Janeiro, Brazil. It brought together Heads of state and government officials from around the globe together with delegates from United Nations

agencies, international organizations and many representatives from non-governmental organizations. A set of principles to guide future development was adopted. These principles define the rights of people to development, and their responsibilities to safe-guard the common environment.

The Rio principles include the following ideas:

- People are entitled to a healthy and productive life in harmony with nature.
- Development today must not undermine the development and environment needs of present and future generations.
- Environmental issues are best handled with the participation of all concerned citizens. Nations shall facilitate and encourage public awareness and participation by making environmental information widely available.
- The full participation of women is essential to achieve sustainable development. The creativity, ideals and courage of youth and the knowledge of indigenous people are needed too.
- Peace, development and environmental protection are inter-dependent and indivisible.

A few further concerns of the Earth Summit in Rio are repeated in the following.

Humanity stands at a defining moment in history. The world is confronted with worsening poverty, hunger, ill health, illiteracy, and the continuing deterioration of the ecosystems on which we depend for our well-being. The disparities between the rich and poor continue.

The only way to assure ourselves of a safer, more prosperous future is to deal with environment and development issues together in a balanced manner. We must fulfil basic human needs, improve living standards for all and better protect and manage ecosystems. No nation can secure its future alone; but together we can – in a global partnership for sustainable development.

Agenda 21, adopted at the Earth Summit in Rio de Janeiro, reflects a global consensus and political commitment at the highest level on development and environment co-operation. The Agenda deals with both the pressing problems of today and the need to prepare for the challenges of the next century.

The following four Earth Summit themes should also be mentioned here.

a) Population and sustain ability

The world's growing population and production combine with unsustainable consumption patterns, are putting increasing stress on air, land, water, energy and other essential resources. The world's population was more than 5.5 billion in 1993, and is expected to exceed 8 billion by the year 2020.

b) Combating deforestation

Forests are a source of timber, firewood and other goods. They also play an important role in soil and water conservation, maintaining a healthy atmosphere and maintaining biological diversity of plants and animals.

Forests are renewable and, when managed in a way that is compatible with environmental conservation, can produce goods and services to assist in development.

There is an urgent need to conserve and plant forests in developed and developing countries to maintain or restore the ecological balance, and to provide for human needs.

c) Education, training and public awareness

Many people do not understand the close ties between human activities and the environment because they have inaccurate or insufficient information.

There is a need to increase peoples sensitivity to, and involvement in, finding solutions for environment and development problems. Education can give people the environmental and ethical awareness, values and attitudes, skills and behaviour needed for sustainable development and human development.

Basic education is the underpinning for environment and development education. All countries should strive for universal access to education.

To improve sustainable development education, nations should seek to:

- Make environment and development education available to people of all ages.

- Involve preschool- and schoolchildren in local and regional studies on environmental health, including safe drinking water, sanitation, food and the environmental and economic use.

d) Children and youth in sustainable development

Youth makes up nearly one-third of the world's population, and needs a voice in determining their own future. Their active role in the protection of the environment and involvement in decisions on environment and development is critical to the long-term success of Agenda 21.

Development plans should ensure young people of a secure future, including a healthy environment, improved living standards, education and jobs.

Governments should consult and let youth participate in decisions that affect the environment. (Youth should also be represented at international meetings, and participate in decision-making at the United Nations.)

Children make up nearly half the population in many developing countries. In both developing and industrialized countries, children are highly vulnerable to the effects of environmental degradation.

The Earth Summit and Iceland

The environment situation in Iceland and the country's position was described at the Rio conference in an address given the Environment Minister. A few excerpts follow.

As we become more aware of the severe environmental problems facing many areas of the world, Icelanders must admit to themselves that they are in an extremely enviable position. Owing to Iceland's sparse population, high standard of living, low level of industrialization, the use of environmentally sound and renewable energy resources, and little crop cultivation, the level of pollution in Iceland is relatively low. On the other hand we have our share of environmental problems such as serious destruction of the vegetative cover and soil erosion.

We are fortunate in that we have an abundance of non-polluting and renewable energy resources which we have utilized only to a small extent. At present 94 per cent of our electricity is produced by hydro-power, 6 per cent derives from geothermal sources and a

mere 0.1 per cent is oil generated. Geothermal energy provides for 85 per cent of the requirements for space heating in Iceland.

First, it is generally recognized that land based sources contribute about 70 per cent of all marine pollution. This is why we should without any further delay draw up an international convention for the prevention of marine pollution from all land based sources.

Secondly, it is well known that persistent organic substances discharged into the sea, not least by the industrialized countries, pose a grave threat to the marine ecosystem. Such discharges must be brought to a halt and the precautionary principle should be applied, as elsewhere in environmental protection.

Thirdly, a ban should be imposed not later than in 1998 against all disposal of radioactive wastes into the sea from land-based or sea-based sources. Similarly, no storage or disposal of nuclear waste should be allowed in sub-seabed repositories.

Iceland – education and the environment

In Iceland there has been a growing understanding of the importance of environmental issues. Recently, the Ministry of the Environment assigned seven work groups to consider various aspects of the environment and its relation or links to different activities and features of society, agriculture, the fisheries, tourism, communication, health etc.

One of the groups discussed environmental education in Iceland. In its report to the government, education in this important field at different levels in the school system is contemplated as well as education outside the traditional school system. Improved education and information on the environment is a prerequisite to a beneficial relationship between man and nature. Increased understanding of environmental issues diminishes the inclination to have short term goals in mind only, when utilizing natural resources. Everyone should realize that handling of environmental issues touches upon all aspects of society and its individual members, their life and health, of both the present and future generations.

The school system

As 30% of the nation is attending school at some level, it is important to emphasize the development of environment education in general. Even though main goals of upbringing and education are

put forward by the parliament and the Ministry of Culture and Education, each school is supposed to design its own working plan embracing the main goals but including as well specific needs related to the surrounding environment.

Environment education has obvious links with the natural sciences, ethics, aesthetics, health sciences and sociology. It also has in some respects ties to commerce, law, engineering and management.

In 1990 on behalf of the Ministry of Culture and Education environment education was examined in preschools, elementary schools and secondary schools. Some interesting indications were obtained in the inquiry. It showed that more than 75% of children in preschools and elementary schools get out once a year or more, often with their teacher, to study the natural surroundings of their school. Most children at this school level take part in cleaning and improving the vicinity of their schools which is on the other hand not common in secondary schools. One third of the children in preschools and half of the pupils in elementary schools plant trees or participate in vegetation preservation, whereas only about one fourth of the secondary school students do so.

The preschool

The Educational Plan formulated by the Ministry of Culture and Education, is a kind of a study plan of the schools. The importance of environmental education is stressed. It is assumed that children in preschools, (i.e. nursery schools, day care and kindergarten), get the opportunity to become acquainted with nature and learn from it. Many preschool teachers support such things with great enthusiasm. The Preschool Teachers Association and The College for Preschool Teachers have shown great interest in promoting such learning. Environment education has been strengthened intensively in the last years. Quite often, a theme is chosen, like water, weather, the tree or even the concept of creation, and treated during a considerable time period. Effort is being made to approach the topic from different directions by various observations, experiments and interpretations in words, play and art. Excursions are executed to study both man made and natural environment.

Environment education is not a specific subject in the elementary school system. However, the topic "environment" in a narrow sense,

in connection with nature, society and daily life, is touched upon. The stage of environment education and related topics is thus dealt with just as much outside the school system as inside the formal school establishment.

The evolving attitude

As environmental education does not have as clear outline as traditional subjects and forms rather a part of other subjects, the success of the education very much rests upon the interest and energy of the teacher.

The way of teaching related subjects has changed during the last decades. During the sixties and seventies the emphasis was on nature. Ecology established itself in biology. In the elementary school system emphasis on positive attitude towards nature increased and the ideas of natural protection pressed forward.

In the eighties active participation was encouraged in matters of concern. This emphasis arouses sometimes demands for new ways of living. It was hoped that environment education and direct student participation would result in more responsible conduct towards Nature. Knowledge, understanding and participation were meant to influence behaviour and the way of life. Emphasis was therefore on the school, on children and youth, those who would inherit the country and its nature with scot and lot.

This approach has not given intended results. Doubts have been expressed that elementary schools are not strong enough to influence behaviour and the way of life demanded by the natural protection philosophy.

In the nineties, however, teachers are making use of their experience and the emphasis has now shifted towards the idea of sustainable development. Projects are designed to deal with subjects of dispute occurring between different utilitarian groups making use of natural resources. Man is able to make use of natural resources without going too far or destroying the possibilites of future generations. Programs in environment education deal with knowledge, attitude, participation, responsibility, ethics and aesthetics. They extend to all levels of the school system.

Preschools and nature

In an Educational Plan, published by the Ministry of Culture and Education in 1985, a chapter dealt with the role of nature in the upbringing. The importance of acquaintance with nature was stressed, for the child's overall development and learning. All living creatures are dependent upon each other and the environment. The livelihood of man, his life and health, depends upon nature and natural forces, even more than sometimes is realized.

Therefore, knowledge of nature, its processes and phenomena, is important in his struggle in life. In addition, nature is a prominent source of beauty and delight that is healthy to be able to enjoy.

In modern society children have less opportunity than before to enjoy nature by their own experience. Already at preschool age, effort should be made to make up for this. In the education, children should learn to respect other living creatures, man, animals and plants, and be considerate towards other parts of nature, the land, air, water and sea. Preschools, not least those in the towns, should design plenty of assignments to provide the kids with rich experience and direct contact with nature as far as possible.

The assignments could be conveniently divided into exercises on man, nature and time. The first group would deal with man's body, its evolution, birth, growth and development, ageing and death. Also, health, sanitation, cleaning, food and motion. In the exercises on nature, plants and animals should be examined, the seasons discussed, climate and weather, planting and growing, conduct in nature and out-door areas, the ground, air, water, fire and natural protection. Many facts and concepts can be attached to questions on time: the calendar, simple observations and daily life experiments, various tools, energy, electricity, basic concepts in mathematics, size, length, weight and space.

Snow is great!

Living nature is a good play-ground for children where they can move freely, run, jump and climb, and at the same time get to know animals and plants by watching and touching. Indoor, at the nursery school, a space in the class room corner should be put aside for natural specimens and tools like a magnifying glass. There, the small scientists could further explore things brought in from the outdoors or look at clarifying pictures in nature-books.

A beautiful example of an environmental winter program for children was one on the theme "water", carried out in a preschool, Furuborg in Reykjavik, later described in this book. It had many aspects and the work was performed in nature, back at the nursery school and by visits to institutes dealing with water in one way or another.

Final words

In Iceland, there is one outstanding problem in the area of natural protection, soil erosion. This has only recently been realized and admitted by the authorities of the country. A handful of natural scientists, idealists and farmers tried for decades during this century to open the eyes of the public so that they could influence the politicians. It was hard to believe that man had destroyed the

natural woods in a few centuries after settlement 1100 years ago, by cutting and overgrazing. Now, this has been admitted and the children of Iceland form an effective, little army of creation and hope, bringing back the green cover of vegetation which characterised the country before arrival of man.

All over Iceland children help adults or work on their own with vigour and enthusiasm by sowing seeds and planting small trees in protected areas. The OMEP National Committee of Iceland established in 1994 a tree-planting space allotted by the Reykjavik Electricity Authority in the vicinity of Thingvellir. The members of OMEP and their families will in co-operation with Reykjavik municipality gather every year to plant trees, one for each child born in Reykjavik during the last year – until the year 2025 when the Children's Park has been fully developed.

But children of Iceland have many other things to learn and enjoy in their country. Volcanoes of a land in creation, glaciers, the sea around, even occasional sea ice approaching and new islands being created – up from the ocean bottom – , birds and plants in a sub-arctic climate with mild winters and cool summers, all this and still more fascinates young minds and provides material for unsuspected questions.

Nothing will protect Nature more effectively, our Earth, than the individual's opportunity to enjoy nature in childhood, crawl, walk and run surrounded by growing plants, trees and the variety of animals we still have around us. Despite all the universal reports and global plans quoted very briefly above, nothing works if the child is not digging its small hand into the soil, feeling the creative "dirt". Without the touch, all those words are not only dull, but worthless.

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CAN CHILDREN LEARNING TO PROTECT THE NATURAL ENVIRONMENT, PROFIT FROM THE WISDOM OF INDIGENOUS PEOPLES?

Professor Per-Olav Tiller

First a little tale:

> *Two creatures of the forest – a squirrel and a bird – are discussing the question of the weight of snow. The bird insists that a snowflake is too small and light to have any weight at all. The squirrel protests and says he knows, because he has seen a snowflake fall upon a twig on a branch of a tree, and the branch broke.*

The aim of this presentation is to make a contribution to the development and enhancement of children's concern and care for their environment, in particular their feeling of responsibility for the conservation of the natural milieu.

Such a venture may be based on a variety of theoretical approaches. Instead, the starting point will be some observations and responses gathered directly from the world of children themselves, and then regard these as primary data in search of an adequate theory.

In the subsequent scouting for adequate terms and dimensions to describe the phenomena encountered I came across the work of two American researchers – Louise Chawla and Roger Hart – who in their work on a "model of the development of children's concern for the physical environment" are concerned with the "origins of environmental knowledge, emotion and action". Their model thus encompasses the same three dimensions that I myself have suggested as the components of social care – be it child care or care for the elderly in social work – as an integrated structure of emotion, understanding and performance. The same threefold complex of feeling, knowing, and performing is also presented by Nancy Eisenberg in her comprehensive analysis of "pro-social behaviour".

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It should be noted that the distinction between the emotional, cognitive and instrumental "elements" meant to be purely analytic becomes significant to the very degree that our education and socialization one-sidedly emphasize the instrumental and cognitive faculties. Certainly, to the young child itself, as to members of several other cultures than our own, the distinction has no meaning. The child's cognition is emotional, its feelings are instrumental, to do means to know, seeing means feeling, etc. The splitting up of this totality requires a forceful education and socialization.

What this suggests, is that we are speaking of a relationship between man and nature as essentially identical with a relationship between human beings. And this leads us immediately to rethinking one frequently emphasized characteristic of children's thought, i.e. "animism".

Concerning the phenomenon of children's understanding of the physical world, most researchers emphasize the central position of the Swiss psychologist Jean Piaget. The mentioned authors Chawla and Hart point out that in this type of understanding the emotional element has no place other than as a possible "source of error", a subjective and thus distortive factor. The authors refer to Vygotsky's criticism that what Piaget found are not laws of nature, but are "historically and socially determined". It may above all be said that the very exclusion of the emotional component – or the categorical distinction between feeling and thinking – is a cultural and social phenomenon.

Piaget, then, clearly is concerned with the cognitive component, with thinking, not with feeling, and with performance – or the instrumental component – only as a manifestation of the cognitive level of development. It is as if Piaget needs to "reserve" the instrumental aspect for reasons of methodology: performance is of interest mainly as a way to assess the quality of cognition.

Perhaps more important is the fact that this model entails two other important limitations: For one thing, the physical world is seen as an external reality only – that is; it does not include the child itself, and thus does not see "reality" as a relation between the observer and the observed, the agent and the world acted upon. For another, and this is a consequence of the limitation of the model, the studies by Piaget and his followers for the most part have to do with

perception of inanimate "objects", not with nature as a realm of living creation. Thus Piaget mainly explains the development of understanding of mechanical operation and functioning.

This approach seems to ignore the fact that the so-called "object" is not only acted upon by the child, but that it instigates, inspires, releases or provokes behaviour in the child, thus creating an agent. Objects have subjective properties: they make us curious, afraid, pleased, we shudder, smile, avoid, approach. To a child, these properties of the so-called "external" world are more obvious, while the adult mind tends to see them as "projections" and thus to subtract from them properties that make them less objective, i.e. available for manipulation, control, exploitation.

The instrumentalist approach to cognition of Piaget and his followers may lead to the perception of emotional qualities of external reality as "man-made" illusions. They are not *there*, only projected, thus existing only in our minds. In a way, this represents a mentalistic orientation. Isn't it a paradox that field dependence and ensuing stimulus-bound responses (the supremacy of the "object") are subjective? Certainly, experience as illusory emphasizes the operation of the human mind. This mentalistic approach is abundant also in modern social theory, as when both nature and childhood are seen as "constructs", a term conveying something illusory or at least a product of the human mind, the source of nature thus being man himself. A parallel statement is that "nature" presupposes "culture", that there is no such thing as nature in itself, that Nature is the horizon of culture. Each time we change culture, we change the horizon.

To further children's responsibility and care for nature as well as respect for their culture, a more suitable proposition is that "nature is the home of culture"

And in studying "childhood and environment" we must necessarily be interested in children's perception of nature. Because children too have ideas about nature as an external reality. In many ways children are particularly vulnerable also in relation to nature, and the "child at risk" also in this connection has received increased attention.

Nature and childhood then, may both be seen as exposed to serious threat. However, child research in the last few decades has

made us aware that the child is far from a passive receiver or an object of treatment, but an agent as well, not only acted upon but an actor.

It seems that in spite of these new insights, we continue to see children more or less as a part of our natural environment. We tend to subordinate children within the sphere of reproduction, thereby ignoring their production, for instance, of culture, we place them in the private world of recreation, so the phenomenon of their being – as creation – is overlooked, much as their "doing" – creating – is ignored. We must instead ask: How does this agent – the child – perceive and act upon nature? How does man communicate with the outside world as a partner in a relationship? Are there particularly adult and childish forms of this? To what extent do children share our adult conceptions, for instance of nature as "natural"?

It seems to be well documented that there are certain common characteristics of children (in our culture) and indigenous peoples concerning the perception of nature that are of particular relevance to the question of care and responsibility. The most central cognitive characteristic seems to be the phenomenon of "animism". Actually, animism is sometimes used as the example par excellence of an underdeveloped mind.

In the novels and stories by the Nordic author Willian Heinesen this characteristic of children's thoughts has been described in this way:

> *The child's animistic perception of the outer world does not reckon with "objects", only "beings". Thus all things have their own appearance and their own will. The child connects everything with its own mind and gives life to them" (Skardhammar 1993). In this way, the child may establish an identification with forms of nature. This term implies a perception of sameness or "being one with.*

What concerns us in this connection is that there is, even in small children, a capacity not only for the more emotional empathic understanding of nature, but also a very solid base for an ecologically meaningful cognitive structuring of nature. It seems clear that traditional types of school education tend to counteract and break down the more complex – but less complicated – ways to learning and understanding that are close at hand. Adding

"environment" or "understanding nature" to the already long list of artificially separated subjects would at best be a very non-ecological measure.

So far little research has been made on children's empathic response toward nature or animals. However, examples are plentiful and easy to find, for instance in children's conversation. Rather than a long list of examples from an abundance of observations, a few selected episodes may illustrate the feelings and understanding involved:

Two boys have found an injured crow. They have tried to repair its broken wing, and hope it will be ok. They demonstrate – by waving their arms – how the crow must try: "Fly! Fly!"

Two small girls are picking up black snails on the road, moving them to the other side, explaining that snails cannot move very fast, so they could be run over by a car.

A boy about 4 years old was a passenger in my car one day when the sun was shining on bright new fallen snow crystals on the road. He started to kick me, angry because I had driven over a star and killed it.

Vilgot 2 years and Henny 3 years studying the chickens

In a Norwegian study of school children's experience in connection with a visit to a 4–H-farm, where they took part in the daily care for

cows, pigs, chickens etc., strong emphatic responses were given to the question of the value of "city farms". When they enjoyed the experience very much, because they felt the animals were happy, but protested against the idea of animals having to live in the city, with its noise and pollution.

Such empathic responses are in some instances also clearly animistic when the object of the child's concern is a plant, a tree or some other supposedly inanimate part of nature. An example is the example of the 6 year old boy, who on seeing a tree in the yard being cut down, exclaimed: "Too bad! Now Tom will get no wind for his kite to fly!"

All such examples may be analysed in terms of what we could term distortion of reality. In the description of such episodes, it is commonly referred to such phenomena of infantile omnipotence, projection of self, animism in several of them, etc. However, what should inspire our strongest interest is that the most striking common characteristic seems to be empathy, pity, compassion, in other words a social response, altruistic rather than ego-centric.

In a broader treatment of the phenomenon, Louise Chawla describes these perceptions by stating that "in childhood, the universe is active". This is going a step further than ascribing life to all things, since not only does nature have feelings, it even acts purposefully, willed. "Clouds and rivers make their way as deliberately as dogs and people. Trees feel winter cold. A stone trips an intruder. The moon and stars commune" (1994. p. 145). We may ask which of the two types of perception is the more correct: The external non-human natural world as a meaningless and in reality dead "thing" or "mechanism" or an organized, interacting "being". And further: which of the two types of experience is the more likely to lead to the final deterioration and destruction of life itself?

Such observations strengthen the assumption of a capacity for ecological understanding in children. And in fact, Stewart Cohen and Diane Horm-Wingerd (1993) have shown preschool children to posses relatively accurate ecological comprehension. In general environmental research has demonstrated a reciprocal relationship between the person and the natural world, that is, experiencing nature has an impact on structuring our perceptions and values concerning

the world (Hester & O'Donnell 1987, Sebba 1991). The amount of studies within this field is steadily increasing.

The American Indian author Forrest Carter in his autobiography "Little Tree" tells about his experiences on moving to live with his grandfather in the woods. The first night on the new place he fell asleep listening to how the trees, the river and others *"tell his other siblings that now he has arrived"*.

The fact is, the child's experience of nature as animated, wilful, and purposeful, is an essentially social perception.

Carina 7 years: "I love our nature"

Our treatment of the subject thus far has led to a point of connection: The assumedly primitive, underdeveloped and projective phenomenon of "animism" meets with another central trait that in particular has furthered the idea of the child as a social person and a social agent, namely the child's capacity for empathy, "Einfühlung". Rather than assuming an infantile lack of border between self and environment as a deficiency, we should recognize here a manifestation of original connectedness, identity, which in its strongest and most conscious form may be known as compassion.

But before drawing such a conclusion, some evidence or documentation is required. In addition to the "animistic" responses

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presented above, I shall therefore present a few examples of the phenomenon of empathy, as found in a Norwegian study of preschool children.

In this study (Schram 1993) various types of care or "pro-social behaviour" in preschool children in a city and in a small rural community were analysed. All the children interviewed were able to report some instance of having performed acts of care, support and help. Such behaviour may have many causes, and the children were also asked to give their reasons for these behaviours. Their motives might be reward, praise, obligation or duty, practical necessity, or others.

Here are some examples of a strikingly frequent type of reasons given as answers to questions about "why" did they do it:

"Because I thought then he would be glad"

"Because she cannot manage it all by herself"

"I didn't want Grandma to be cold"

"For he becomes sad so easily"

"Because else she would become sad"

"Because else she becomes so very tired"

Apart from practical reasons given such empathic motivation was the most dominant type, representing 43% of all responses, ranking above "duty" or "task", "self-interest", "ego ideal" and others. The common element in these motivations seems, then, to be "pity", "compassion", "identification" in the meaning of what we call "innlevelse", literally to "live oneself into" another.

But let us turn to more global matters:

In an inspiring article: "In the nature of things: the environment and everyday life" Cindi Katz and Andrew Kirby explain how dominance over nature is a modernistic project and also how an externalization of nature is built into our concept of science.

This externalization is far from a childish characteristic, not typical of the way children relate to nature. Another investigator, Kenneth Olwig, explains that "children's own descriptions of nature and landscape do not present nature as things, objects, but as potentialities, in particular for play. Nature is identified with

activity, with seasonal change and something that expresses social development."

Olwig says: "The goal of the rational, scientific state ... is to reduce nature to a resource for science, production and the reasoning thought. ... The tangible success of science and the use of nature as a resource has given this way of looking at nature tremendous power in our society." He cites E. Cobb on the need to "domesticate landscape as well as home and personality" and on "the present hypnotic attraction for mechanical motion".

With Kenneth Olwig – but from a somewhat different angle – I question Piaget's assumption that the child's "spontaneous and immediate tendency to confuse ... internal and external, and the psychical and physical" requires a process of "decentering" before the child may understand the world as "something which obeys its own laws, independent of the will of the child", who is "lacking in feelings of the reciprocal nature of all relationships". One might possibly see the child's lack of "decentering" as a perception of "sameness" (lack of differentiation) between subject and object due to a particular capacity for identification – (Einfühlung) – which in our society has to be unlearned for socialisation to be successful. This is obtained through an insistence on mastery, dominance and exploitation of nature, i.e. of the "external" world for purposes of the ego. In Freud's terminology: "Where IT was, I shall be", i.e. nature as inferior to mind, matter to spirit.

Gregory Bateson is quoted by Olwig: "If you put God outside and set him vis-a-vis his creation and if you have the idea that you are created in his image, you will logically ... see the world around you as mindless and therefore not entitled to moral or ethical consideration. The environment will seem to be yours to exploit ... If this is your estimate of your relation to nature and you have an advanced technology, your likelihood of survival will be that of a snowball in hell. You will die either of the toxic by-products of your own hate, or, simply, of over-population and overgrazing."

We are quick to label certain types of experience as "primitive" in a negative sense. "Animism" is a good example. But why should it be more mature or human or developed or intelligent to see a river primarily as a source of electric power or drinking water or playground for the angler, than to see it as a fellow "spirit"? Our

arrogant assumption is only possible when we decide arbitrarily – or obediently accept – that our Western technological/economical society is superior. That it should be dominant because it dominates.

The Apache Indian Bobby Castillo who visited Trondheim some time ago as part of the preparations for a conference of indigenous peoples, documents how the recent discovery of minerals, gas and oil in the Indian territories has led to violent attempts to chase the Indians away from these areas which they have been guaranteed by law.

One significant argument in such conflicts is the indigenous peoples' lack of ability or interest in developing these natural sources of welfare and prosperity.

If we now introduce the child perceived as "nature" in this "God-like" adult humanity – then, of course, childhood will be just another resource to exploit.

There seem to be two possible ways out of this dilemma:

Either to see the child as a social person and a citizen and therefore as estranged from nature or to stop exploitation of nature and develop respect for nature in all its forms, including childhood.

To what extent may the wisdom of folklore and mythology still be a source of ecological insight, that could also serve educational ends? The respect and gratitude in relation to nature reported from American Indians, Inuits, Sami and other northern peoples is the theme also in so many of the most popular folk tales in my own country – probably told children with a view to socialisation and learning of cultural values. One of the most illuminating tales is the one about the two sisters – literally translated: the "man's daughter" and the "woman's daughter" – a version of the Cinderella story. The good daughter – the step daughter – succeeds because she heeds the advice of birds, she helps birds, cows, apple trees, etc. Such is also the character of her male counterpart, the Ash lad, who – in contrast to his older, arrogant clever brothers goes out of his way to help and shares his meagre food, etc. Like Cinderella he succeeds because he heeds the warnings of animals and other creatures or symbols of nature, he "takes care" and gives care. His helpers may be fantastic giants, witches, elves, but regularly also animals.

The wisdom of these folk tales is in many ways identical with beliefs also reported from aborigines. We find the same theme also in folk tales from many countries.

But in these tales we meet not only animals as persons. Also trees, bushes, plants, flowers may be friends or enemies. They are usually friendly when the hero or heroine shows respect for nature. Even clouds and wind may be individuals.

Children tend to love such tales, and seem to find this animated natural world completely normal.

It seems fairly well documented that children and indigenous peoples share some fundamental ecological insight. This insight is in part based on a kind of animism that to traditional Western thought is a sign of underdevelopment. I may here conclude my presentation by stating that the animistic empathy of childhood represents the very basis of adequate care and protection of nature as well as human survival.

Confronted with the massive attack from the established adult society on the animated, meaningful and connected "childish" experience, childhood is a threatened form of existence in about the same way as is nature, they risk a common fate of extinction.

What hope can we have to help our children master the gigantic tasks that will confront them in trying to win the struggle for saving our natural environment? Can we find any reason for optimism when we consider the enormous dimension of the threat?

Let us at this point recall the little tale of the squirrel and the bird, expressing the ecological wisdom that the proverbial drop of water in the ocean may at the same time be the drop that makes the cup run over: The drop and the snowflake may just as well remind us of the tremendous potentiality in the first step to turn the tide.

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ENVIRONMENTAL CO-OPERATION BETWEEN CHILDREN, ADULTS AND AUTHORITIES

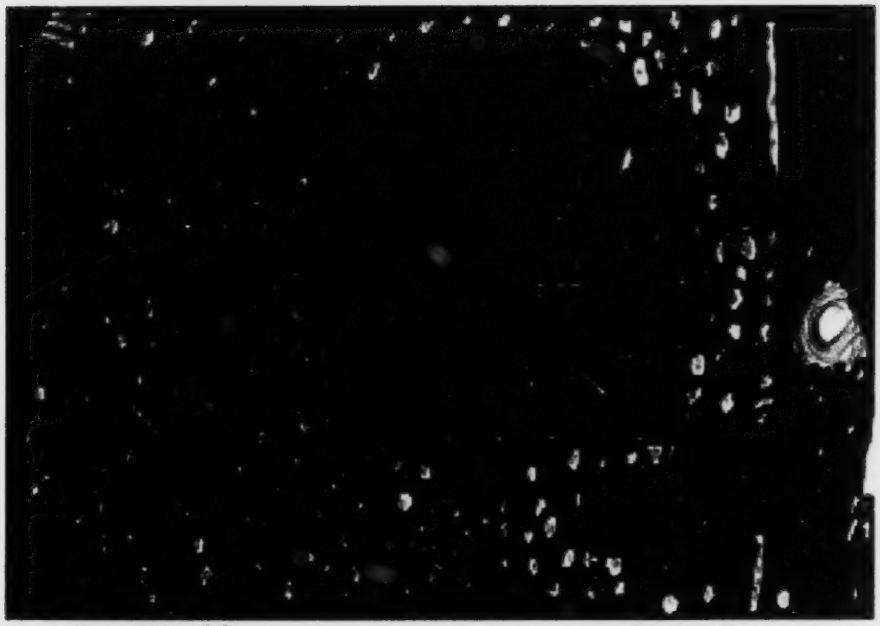
Kaija Kess

The environment has great importance in child's development. In Finland a child stays outdoors approximately from 4 to 6 hours daily, usually regardless of weather. *A child knows thoroughly his environment*, from trees to ditches. Very few adults have so close information about their environment. However, it's the adult who is making the decisions about environment.

It's a Finnish heritage to *offer pure nature and environment for children*. The tradition in upbringing children emphasizes outdoor activities for wealthy growth of children. In many day care centres the ecological way of thinking is a part of daily life. The school system gives great importance to physical education and studies of natural science.

Today there are however *many threats to endanger this tradition.* In a global view, the danger to the environment posed by the uncontrolled exploitation of the earth's natural resources is universally recognized. Locally children's environment is radically narrowed by urban structures. This means that children's social contacts are limited and their possibilities to learn and develop themselves through spontaneous experiences are hindered. Children are also losing contact with their local culture and natural environment. This is one of the alarming trends also in Finland.

During the environmental work of the Mannerheim League for Child Welfare (the League) it has also appeared that *the consciousness of environmental authorities is defective* when it's about problems of children's environment. This concerns especially the authorities in responsibility for planning of communities, traffic connections and designing playgrounds. These authorities don't know about the needs and expectations of children concerning their environment. There is a severe lack of methods both to gather information from children and to use the gathered information in decision-making.



Our World *Anton 7 years*

The legislation

Future generations have the same right as we have to clean air, clear water and green forests. "Towards sustain ability" embodies the central theme of the 1992 Earth Summit, the *United Nations Conference on the Environment and Development* (UNCED) as set out in the Agenda 21 document. The idea is that we cannot freely use or abuse the earth's environment. The environment has a value and a price which must be recognized. The Brundtland Report "Our common future" 1987 included the definition of the sustainable development: "A development which meets the needs of the present without compromising the ability of future generations to meet their own needs."

The chapter 25 in the Agenda 21 concerns children and youth. It sets aims for directing the education towards sustained ability, increasing the environmental consciousness among children in a way that their possibilities of participating in environmental decision-making will improve, and guaranteeing safe and healthy future for children.

Finland has adopted the Agenda 21 document. Finland has also many *national strategies* concerning the environmental education in schools and nurseries.

The United Nation Convention on the Rights of the Child has been ratified by Finland in 1992. By signing this convention Finland has committed itself to promoting the well-being and interests of children and youth. The article 3 includes an obligation for the authorities in all their acts to give priority to the rights of children and youth. The article 12 obliges the authorities to pay attention to the views of children according to their age and state of development. The article 12 also emphasizes that the authorities have to offer a special opportunity for children and youth to be heard.

Like all the countries ratifying the United Nation Convention on the Rights of the Child, Finland had an observation committee. The outcome of the committee was depressing: the authorities don't pay attention to the rights of children and youth in the way the Convention requires. The situation is not so much due to the state of national legislation, but instead it's a reflection of the way of thinking and working.

It's the matter of turning words into action. There are many international conventions and national legislation and strategies but fundamentally it's the question about the way of respecting the rights of children in everyday actions.

The response of The Mannerheim League for Child Welfare: Co-operation between children, adults and authorities

The League celebrated its 75th anniversary in October 1995. The League has 65.000 members, 600 local societies, 13 district associations and the headquarters in Helsinki. The headquarters carries out the national projects and is responsible of the lobbying both in Finland and abroad. The district associations and the local societies do the same work in their provinces and communities. The district associations and the local societies have also their own ways of work arisen from the local needs. Traditionally the activities of the League have been within reach of everybody, regardless of the membership of the League.

During the years the League has done much to better children's environment. The main point has been in questions about health and education. In 1997-1999 the environmental work is one of the main points in the League's work. The environmental work of today aims to response the demands of the present world. The work has three main goals:

1. *The consideration* of children's rights in all environmental designing and planning.
2. *The participation* of children and youth in environmental decision-making and management.
3. *The creation* of common language and methods of co-operation for environmental authorities and children.

Successful approaches have been developed to main these goals. The choice between the procedures locally depends on many things, e.g. the nature of the situation or the existent pattern of co-operation. The main approaches are following:

1. The agents for children's environmental issues

The League educates voluntary agents for children's environmental issues. In May 1996 there were 350 voluntary agents all over the country. In addition there are 200 voluntaries in local societies of the League in charge of environmental actions. Among the agents there are housewives, as well as police officers and architects. Their task is to affect locally in planning and decision-making for the better environment for children. They organize happenings, take initiatives, incite conversation and draw attention to environmental issues. The League aims to have at least one voluntary agent in every community of Finland.

The agents have dealt with a wide range of questions. For example:

- The agent in Hartola community has participated in the *road planning* in order to get the children's and families' opinions into consideration.
- The agent in Lieksa community has studied the *planning documents* dealing with this community and set up a meeting between the environmental authorities, the League's local society and children in order to discuss the important matters.

- The agent in Oulu city has opposed the *restrictions for children's play* in the courtyard of a block of flats.
- The agent in Kuusankoski city has drawn the public attention to the hazards of the *train traffic transporting dangerous materials* through the community, e. g. oil, nuclear waste and chemicals.
- The agent in Ylöjärvi community has demanded the inspections to find out if there is *mould in the school building.*

2. The co-operation between voluntary agents and environmental authorities

The voluntary agents co-operate with children, youth, parents and teachers. Their main task is to get them and the environmental authorities to meet, discuss and co-operate. The subject of meeting is usually a concrete problem in the neighbourhood, e. g. a dirty playground or a missing pedestrian crossing. The League supports the co-operation by organizing meetings and offering expertise when its needed.

An example of this kind of co-operation is the *playground inspections.* Every year hundreds of inspections are made by voluntay bodies all over in Finland. The results of these inspections are given as a report to the community authorities responsible for maintaining these playgrounds. The League offers a form for these voluntaries to help their work and reporting.

3. Maintaining the network of voluntaries

The League maintains the interest and the knowledge of voluntary agents in many ways. The League's periodical "Lapsemme" regularly includes articles about environmental issues. The voluntary agents receive three letters per year dealing with the topics of current interest. The League also offers consultation in legal questions. The mass media is giving more and more attention to children's environmental issues and to the work of voluntary agents. As a result of this the network of voluntaries is expanding.

4. Conferences, seminars, meetings

The League organizes conferences etc. which deal with the environmental issues of children. The topics vary in accordance with the current interests and co-operators. The conferences have dealt with the topics e. g. mouldy buildings, traffic, school yards,

radioactive emissions. Especially the voluntary agents are invited to these events, as well as environmental, social welfare and health authorities.

In these occasions the League introduces *methods to guarantee the participation of children* in decisions concerning their environment. There are many experimented methods, e. g. colouring or using the symbols in a map according to liking, studying the surroundings by taking a walk with children, building a miniature to describe the visions of children, making a plan according to the same information the real planners are receiving.

5. The Forum of Experts

Twice a year the League calls experts in environmental issues to gather as a forum. In the work of Forum have participated architects, pedagogists, doctors, psychologists, engineers, lawyers, biologists. They are a great help in outlining the present problems and future visions in children's environmental issues.

6. The participation in environmental legislation

The League participates in legislative process by giving statements, joining committees and being heard as an expert by the Parliament. In these occasions the League emphasizes that the articles 3 and 12 in the United Nation Convention on the Rights of the Child have to be observed in all environmental legislation, decision-making and management.

The use of these experiences in other countries

The countries and their environment vary a lot from each other. Also the child friendliness in societies differs. Although there are some hints which help to create their own approaches in other countries. These hints are based on the experiences in the environmental work of the League:

- *Start with individuals*, both adults and children. Their needs, fears and visions are crucial to the progress of the work.
- *Start with activities that are easily accomplished.* The success will lay a good basis to more ambitious efforts.
- *Bring different groups together* to discuss, form an action team or meet the authorities. Networks are useful, even nowadays obligatory if you want to advance.

- *Use the interest of the media* to support the efforts.
- *Use the influence of non-governmental organization* to broaden the participation of children in the decision making and planning. The support from a respected organization helps them to get their opinions heard.
- *Strengthen the co-ordination* with every groups, organizations and authorities to have more resources, ideas and supporters.

Remember that your "client" is always the child.

The essential aims of environmental education

In all environmental planning, decision-making and management it's crucial to pay particular attention to the needs of children and youth so that the environment would contribute to their development into physically, socially and psychologically healthy, creative, responsible and active members of their societies. This particular attention requires special knowledge about the needs of children and youth. It also requires new methods to guarantee the actual participation of children and youth in the process of environmental decisions.

The educationalists have an important position in defining and accomplishing environmental education. The essential aims of the environmental education are following:

1. The surrounding environment gives pleasant experiences and joy to a child.
2. A child learns to observe by his own senses the surrounding environment and human affects to the nature.
3. A child is capable of creating his own responsible way of life protecting the environment.
4. A child gets the ability and the knowledge required in actual participation in the environmental decisions.

In the matter of fact, one of the main goals of environmental education should be *the education of adults.* We can't as adults avoid the responsibility to act today for the better environment. We can't as adults neglect our obligations to be as an example. The participation of children and youth in environmental work is the most effective form of the environmental education.

THIS IS, AFTER ALL, THE WATER PLANET!

Anne Lea, Associate Professor &
Inger Hilmo, Assistant Professor

Water has no colour,
snow is purest white.
I wonder where
the white all went
from the melting snow
last night.

This poem was written by a 10 year old girl in England (Primary Science Review, 1996). The poem tells us something about peoples' fascination with water and the curiosity it may initiate. Water is not only water or the association of hydrogen and oxygen atoms to form H_2O. It is a substance that is of primary importance to the existence of life on this planet. It is also a substance that allows for intense experiences.

Water opened the language code for Helen A. Keller (1880-1968)[1]. Water has always played a very central role in our lives; spanning from the jumping and running through puddles in the spring to the daily struggle for necessary water supplies among people in the world's dry areas.

This article will first focus briefly on a few aspects of water and secondly provide examples from a few day care centres of how water can be used in work with children. Finally, we will make some suggestions to how water may be exploited as an educational

[1] Helen A. Keller was born in the USA. At the age of 19 months (before she had learned to speak) she became both deaf and blind after a sickness. It was the combination of water running over one hand, and the spelling of the word "water" in the other that made it possible for her to connect the concept and the symbol representation for water. This understanding later allowed Helen Keller to speak and also master the language to the extent that she finally became a famous author.

resource for early childhood development and for environmental understanding among young children. The reasons for working with water can be many.

Water is beautiful

A drop of water that glitters in the sun or a glass of water that separates white light into a rainbow are beautiful sights. Water can move us emotionally and is often an inspiration to artists. Water can also be frightening, with enough power to create disasters in nature.

For children, it is easy to grasp the beauty of water: silent rain, raindrops falling into a pond, a bobbling stream, snow crystals or ice in winter. While rain and streaming water can be observed almost all over the world, snow and ice are more seldom. Snow is a constructive and creative material. The winters in Norway give children the possibility of building snow caves with ice windows, they can make ice lights, snow sculptures and, of course, snowmen. Warm clothes and a good pair of mittens are the only necessary prerequisites when working with it

Water freezes to ice in many countries during the winter months. In places that are not so cold, children can gain experience with ice by freezing water in the freezer. Have you tried filling a balloon with water and then placing it in the freezer? After a few hours a ball of ice is formed. When removing the balloon, children are excited both to see and feel the ice ball. It is cold and hard, yet smooth and beautiful. Place the ice ball in a container with water and watch what happens. It crackles and cracks making exciting patterns. Disposable rubber gloves may also be filled with water and frozen. Coloured water and the addition of whatever small items adds a nice surprise to the frozen "hands" when hung up on a string. Children really enjoy these surprises.

Water as an artistic inspiration

Many known composers and musicians have been inspired by water as a theme. Well known examples span from Händel's classical masterpiece "Water Music" to Bruce Springsteen's "The River". Most countries have rhymes and rules about water and rain. Perhaps your language also has a *pluppe plopp plopp plopp* song?

The sound and experience of water in different forms may also provide inspiration for children's music, rhyme and word plays. The poem at the beginning of this article was an example of a child's composition with words. It could as well have been the result of directing its attention to water. We can lead children in the direction of a particular theme/topic through such activities.

A day care centre that worked with sound as a topic motivated children to listen to different sounds made by water. The children walked around with a tape recorder, collecting different sounds, most of which were related to water in its many forms. The children became fascinated by the variety of sounds rain can make; from silent, falling rain to rain storms, from falling snow to sleet and hail. They extended their knowledge and observed unknown aspects of water. This is only one example of how we can help children to develop their critical sense of sound.

Water, an essential on our planet

Snow, ice and water are very important parts of daily life to people living in Greenland. For generations, they have depended on and developed knowledge on the different qualities of snow, water and ice in their environment. This knowledge is essential for successful fishing and hunting. For this reason, they have many different ways to describe snow, water and ice. We do not have the need for such information in our lives, but the focusing on detailed aspects of water may improve our ability to make critical observations. Perhaps this is a way to increase our interest, not only in water, but in nature and the environment also?

The comet Hale Bopp passed our planet in 1997 and fascinated all who observed its presence. The comet is essentially made of water and ice, which, when reflecting sunlight, is the reason why it lights up so clear and white. The presence of the comet, together with new information on its contents, has sparked a discussion on the origin of life in the universe. Is it possible that the water on our planet may have come from a comet? We do not have a clear answer to this question, but we do know that without water on earth, life as we know it today would have been impossible. Life originated in the oceans, and all living organisms on the earth contain water. Human are composed of 70% water. The foetus floats in water

within its mothers womb, babies are able to swim before they can walk when given the opportunity. Water surrounds the brain, protecting it from impacts, and is the solvent for most biological substances and allows millions of biochemical reactions to take place in all living organisms.

The human body needs a daily intake of 2-3 litres of water. We will die from lack of water before starving to death. Much of the water we need comes via the food we eat. Especially from fruit and vegetables. Cucumbers, for example, contain 97% water.

This is, however, not the only contribution of water in our lives. Few people have a complete understanding of the world's most important and fundamental process: the photosynthesis. The fact that green plants produce sugar and starch is perhaps known, but that the necessary substances needed for this process are water, carbon dioxide and sunlight are lesser known. The research report from The Primary SPACE Project on Growth writes: *"With increasing age, there was evidence of an increasing discrimination in conditions described...(for plants to grow). Infant children mentioned only three conditions: water, soil and sun, with few referring to all three."* (Russell, 1990, p. 20). Children usually know that plants need water to grow. It is perhaps more difficult to comprehend the significance of carbon dioxide and sunlight in the same process. The above report also says: *"There was very little mention of air or plant food at any age, and no mention at all from the infants."* (Russell, 1990, p. 21). When working with children the challenge is to consolidate and extend their understanding of the importance of water for the growth of plants, and at the same time include the concepts of carbon dioxide and energy from sunlight.

Water as topic in some day care centres

The curiosity of many children will often bring them further in their understanding of the many phenomena in Nature. However, some will just notify the existence of water and its importance, without making other associations. Phenomena that are interconnected and that influence each other will often pass by without being observed. A child may see rain pouring from the clouds, and the jet of water from a fountain. It may record a quiet ocean under a blue sky, or huge waves on a windy day. A child sees water flushing from a faucet

and the vapour above a boiling kettle, it drinks water, sweats and piddles. The child may observe, but it will not necessarily ask questions about the origin of water, and where it ends, or if there is any connection between dark clouds and rain.

Research has shown that children have many different ideas about where rain comes from. A 5 year old from Italy describes it as follows: *"I think that God is watering his flowers and the small drops fall down to us. God has flowers in his garden up in heaven. He takes the hose and waters them. He waters the flowers in the morning, but it doesn't always rain because he doesn't water his flowers every day."* (Barsotti, 1986, p. 0).

The quote above is taken from a book which describes a project in a day care centre in Reggio Emilia, Italy. The employees argue that if children work with a theme, or a part of a theme, it will increase their curiosity and the information they take in will not be a lot of loose facts, but structured into connected knowledge with meaning. In the above case, the theme was rain and the city. Children discovered that a lot of what they thought about rain was not actually correct and needed to change. They also found out that the city had a system for handling rain water. Houses had rain gutters and pipes that led water into a larger system under the streets. This work developed into a project called "water, rain and out of town", developing over a long period of time as new ideas came into play.

"Loar" Day Care Centre in Norway has also used water as a theme during a one year period. The project began by asking where water comes from when we turn on the tap. Just as in Italy, the children had lots of ideas and questions that needed clarification. Eventually, the children on this project traced the water back to its origin, bringing them far away from the centre and into the mountains to a small stream. Through this project children came into contact with the local history, asking older people about how they got their water. Many side activities were initiated, including a trip to a lake where they found small animals and plants. They even tried to fish from a fishing boat. These experiences were used to initiate many additional activities at the centre involving music, drama and art.

The project was called "Water in Lom, from glaciers to villages". The project left results not only among the children, but also in the local community (Berg, 1992).

In yet another day care centre having water as a theme for project work, the water was turned off for one day. When the children arrived there was no water coming out of the tap. What were they to do? How could they wash and prepare food, and what should they drink? They found out that they could borrow water from a neighbour, carrying it in buckets. Water flowing from the tap was no longer taken for granted after this project (Spillum, 1991).

All these projects were experience based, allowing children to explore their local community as information source. The children gained valuable experience in the water cycle as well as water systems in the community.

Water play in preschool

Water to play with

Everyone who has been together with children has experienced how fascinated they are by playing with water. Children who are allowed to be active in a free environment, seldom run past a puddle without hopping and splashing around in the water. The simple task of

helping children wash their hands can lead to lots of creative activities, for example activities focusing on things that float and sink. Furthermore, all parents know that after a long day, children love to take a warm bath and play with all sorts of objects.

When children experiment and play with water, they often work together, they talk together, they can use their senses and wonder about things. Children discover many of the characteristics of water through playing. When children and adults communicate about their experiences, language and concept development is improved. When children express their thoughts and ideas, they are constructing their own knowledge and are given the possibility for both intellectual and personal growth.

Most countries around the world have published activity books giving many good suggestions for water activities. Books about bubbles open the door to activities that soon will lead them to the wonders of rainbows.

Three Danish day care centres provide good examples of how to create an outdoor environment for water activities (Laursen, 1996). One of them has built a water sculpture designed by a local artist; a sculpture made of concrete, earth and rocks that recycles water during daytime, while watering trees and the bushes in the evening. Children play here, and they do get wet, but they claim that wet children are a problem that can be solved.

The second centre has created a water area full of buckets, hoses, water canals and water wheels. When it rains, the water canals fill up with water giving lots of possibilities for activities with the running water.

The third centre has developed a play area that changes with the seasons. The children are staying at the day care centre for up to three years, and they wanted the play area to challenge the fantasy of the children during different seasons. They decided to let a small stream run through the area. A pump recycles the water to the top of the stream. At the bottom, where the stream meets a tiny pond, there is a sand area that provides opportunities for building. The children love playing in this water area (video NFU, 1995).

In Norway it is common practice for day care centres to take children out into nature on a regular basis. Skårungen barnehage in Kristiansand is located in the southern part of Norway, close to the

sea. At least one group of children at this centre travel by boat every day to an island where they spend their time playing at the seashore and discovering a variety of phenomena. After a one year experience one may wonder whether this type of activities attracts boys more than girls. The applications to next year's group include 16 boys, but only two girls. Clearly, parents and teachers should call upon girls to take part in this project.

Other centres take weekly trips into the forests, to a stream or down to the seashore as part of their regular activities. Teachers working in special education have found these trips to be of great benefit for children with special problems like difficulties with language, concentration, physical abilities and social behaviour (Nordahl & Misund, 1996). Having lots of time for preparation as well as time to revise the activity after its completion, are a central part of this method. Equally important is to have lots of time on the trip. When crossing a stream or a bridge, children can often be seen playing Winnie-the-Pooh game dropping a branch on one side of the bridge only to find out that it comes out on the other side (Milne, 1956). The trip should always include time for children's spontaneous activities. It could as well be the major activity of the day. Children always like to come back to the same place, giving them the necessary confidence to explore the area because they also feel safe and comfortable there.

The positive results could be due to the structured and well planned pedagogical work, but the teachers claimed that a very important element was their use of nature and science, both as a base and a frame around their work.

Water as part of the ecology

Nature, environment and technology is one of the five parts of the curricular content in the Framework Plan for Day Care Institutions (BFD, 1996) in Norway.

It emphasises outdoor life and experiences in nature at the preschool level as important both for children's overall development as well as a view to promoting positive attitudes towards nature and environment. And it says that the ecological perspective should be paramount.

The *Plantago Major Project* is another Norwegian project based on outdoor work with children showing good results. The project included children between five and ten years of age, in this way taking the idea of outdoor life from the framework of the day care centres into the first school years. Working in nature in all seasons and all weathers is valuable on its own, but is also a way of reaching a more thorough ecological understanding. (Halvorsen, 1995, and a video, Det norske filminstitutt).

The plan goes on to state that familiarity with everyday technology is also to be established at the preschool age. Playing with water offers many ways of doing this: give children the possibilities to build waterwheels, to play with siphons and hoses, use hoses to find the precise upright position of a board or canals – like in the Danish day care centre referred to above.

All ecosystems depend on water. Knowledge about the importance of water in nature may serve as a basis for growing environmental consciousness among children. Children who are given the opportunity to stay outdoor present themselves with more positive attitudes towards environment and are more willing to take care to preserve their environment.

Children who have the opportunity to plant their own seeds and care for them will come to understand that plants need water to grow. A three year old child who sticks his/her finger into a potted plant and discovers that the soil is dry, has gained a valuable piece of information. Children from the day care centre that turned off the water, became very aware of how much we depend on water in our daily lives. Clean drinking water is taken for granted by children in Norway, but for children in many countries polluted water will be the first environmental problem they meet. Clean water will then perhaps be the first environmental issue young children are concerned with.

Knowledge of the water cycle; from water in the oceans that evaporate into the sky, forms clouds, moves towards land and mountains and falls down as rain again, is central in ecosystems. A growing knowledge of this cycle should be fundamental in an ecological curriculum and can be reached through working with children and water.

Water as a part of the conceptual development

One of the reasons why the Reggio Emilia-inspired project at "Loar" Day Care Centre turned out so successful was perhaps the creative interactions between children and adults (Pramling, Mårdsjö, 1994). Vygotsky emphasises instruction and development as dependent processes, but there is continuous interactions between instruction and development. In this process *"the development of the psychological foundations for instruction in basic subjects does not precede instruction but unfolds in a continuous interaction with the contributions of instruction"* (Vygotsky, 1986, p. 184). Scientific concepts as defined by Vygotsky are always part of a system of relationships and is built up over time. *"Conceptual change is an ongoing process in which the child, in collaboration with a teacher or other students, integrates everyday concepts into a system of related concepts and transforms the raw material of experience onto a coherent system of concepts"*. (Howe, A.C. 1996, p. 39). When a child, together with an adult, is allowed to reflect over experiences, concepts become more conscious. From our experiences working with children and water, we can say that children move from having an unconscious, non-reflected relationship to what water actually is, tc an understanding of what water means to us and it's role in nature. On the one hand they are able to develop a scientific concept of what water is; water is ice, snow and water and has a surface tension. In addition children will be able to develop an understanding of the importance of water in an ecological context. All living things are dependent on water. In the end children discover how everyday concepts are part of a system of relationships and how these fit in with more scientific concepts. Conceptual understanding develops as a result of everyday experiences merging with scientific concepts.

A final drop of water

An ecological awareness focusing on water is a sound foundation for children who later in their lives shall take responsibility for our planet. Water is found in the surroundings of most day care centres and schools. Children at all ages are interested in water, and playing with water contributes in many ways to the cognitive, social and emotional development of the child.

Margareth Mead, the well-known anthropologist and psychologist, once pointed out that every child should have access to water, preferably running water, because it is unique in strengthening the child's senses. We couldn't agree more.

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WATER – ENVIRONMENTAL EDUCATION FOR PRESCHOOL CHILDREN

Hrafnhildur Sigurðardóttir

Knowledge and understanding of nature, its beauty and power is essential to children. They need to learn how to treat the environment with respect and how to be responsible and aware of everything living, people, animals, plants and so on. This kind of upbringing leads to children who live in tune with nature.

In September 1990 to June 1991 we at the preschool Furuborg in Reykjavik have been working on an environmental project entitled "Water". The entire staff partook in planning this year and many interesting ideas came up. Additionally we followed the usual planning based on the seasons and the various festivals associated with our nation and culture.

Finally we decided to divide the project into four categories:

Water – home, food and sanitation.
Water and our city, Reykjavik.
Water and our country, Iceland.
Water and the world.

This division we based on the understanding children have of the environment and the world around them. The home is their most immediate world, while our city is more distant to them. Even more distant is our country and many of its natural phenomena, followed by the world, which is most alien to them, and people's situation in far away countries.

Water – home, food and sanitation

In September and October we worked on the first part of the project. Our goal was to introduce the children to the importance of water in the home concerning sanitation, cooking, growing of plants and the heating of homes. The children tried out the various properties of water and its effect upon the various elements of nature.

They washed and splashed in the water and learned about the necessity of water for all plants. We tried freezing food and let large ice cubes melt. They travelled back in time through stories and old tales, in addition to visiting museums and old relics related to water, such as wells, washing pools and old spring.

Experiments were made with paper, e.g. to see which kind of paper soaks up the most water. Other experiments were also made with two sheets of paper that were soaked in water, then one was laid out flat to dry while the other was curled up into a ball to see which one dried faster.

We also experimented with whether a potato could better take a drought with or without the peeling. Experiments were made with the evaporation of water from various glasses and we tried out various items to see if they floated or not. The children also got to taste water with various tastes, such as salt, sugar, lemon and so on. A large ice cube was put on the scale and then we let it melt at room temperature. How long it took for it to melt was written down and the water measured.

One day all water was turned off in the preschool. It was not possible to have water to drink, wash your hands nor flush the toilets. This was a very educational and memorable day for the children.

The children did various artwork related to water, such as water colour paintings, blowing colours reduced by water through straws to create various patterns and painting with their hands and fingers. They also painted on silk with special silk colours. Then they did a mosaic picture at the bottom of a bale, the bale was then filled with water so the picture could be viewed through the water. The children looked at their mirror image through water by submerging mirrors in a bale.

In Iceland we have many words concerning the weather and water, that the children learned to use in various connotations.

Water and our city, Reykjavik

In November to January we worked on the second part of the project. That is, to introduce the children to their city and what it has to offer. The goal was that the children could learn to appreciate the many good properties of the city and the various natural phenomena within it. We visited many places in the city related to

water, both old and new. We visited swimming pools and had a look at water-tanks, as well as discussing the source of warm water from the ground. On a map of Reykjavik we marked in the places we had visited, as well as the children's homes and the preschool. That way the children became familiar with locations and distances within the city. Reykjavik is a unique city when it comes to water. It has a large stream in which salmon-fishing is possible. In the stiller parts of the river you can jump between small rocks, look at your mirror image on the water surface, and listen to the roar of the river itself as well as the sound of smaller streams.

In the centre of Reykjavik is a reasonably large lake, Tjörnin. There you can observe various birds and plants. In winter it's enjoyable to slide across the ice and to be able to walk to the tiny island in the centre of the lake.

The children visited old houses and museums to learn about the homes and lives of their ancestors. They visited old wells and springs and visited modern water works at the edge of town. In Reykjavik there is still to be found a warm pool that was used to wash clothing for over half a century shortly after Reykjavik became a town in 1786. Water was limited in town and sanitation was lax, therefore it can be said that this pool was a real gift from the gods. People laboured there every day, and women could be seen beating clothes against rocks at the largest cooking pot of the country. In Reykjavik, like in most other cities, water needed to be fetched from wells. Thus was created work for both women and men, often people who were "different" and maybe incapable of any other kind of work.

The children were very interested in the wells and the many, and often times strange, stories of these water-carriers. They did a project creating a large model of a water-carrier with two buckets, they also made a model of the washing pools.

Several visits were made to the fire-department. The goal was to introduce the children to the security of having a fire-department nearby and the importance of water for fire-fighting. The visits were both educational as well as entertaining.

The children were received well at all the places we visited and got good guidance. At the preschool they then did projects related to each of the visits. They were shown how important it is for a city

to have good and clean water, and that water is a natural resource that must be preserved well for the future.

Water and our country, Iceland

During February and March we worked on the third part of the project. The goal was to introduce to the children their country with its unique properties in mind and how to treat and use the natural resources in it in a sensible manner. Iceland is in many ways a special country when it comes to water, with its lakes, rivers, springs, waterfalls, geysers and glaciers.

A map of Iceland, as well as photos and slides were much used for this part of the project. This was very enjoyable as many of the children were familiar with the various places where they had either travelled or had relatives. They made a large model of Iceland, moulding the various glaciers and drawing in the most prominent lakes and rivers. The best known volcanoes of Iceland, such as Hekla and Surtsey, were also added to the model, sprouting many discussions of the influence the volcanoes have had upon the country. Many volcanoes in Iceland have not erupted for hundreds of years, while others erupt at regular intervals. When a volcano erupts, flame and ash is sent flying into the air and boiling red glowing lava flows from the volcanic crater long distances over land. When it cools down it becomes lava rock that now covers a large part of our country.

Hot water comes from underneath the ground, when it reaches the surface we call it hot springs. Such warm water is used in Iceland to heat up houses as well as swimming pools. In 1928 people began drilling for warm water in Reykjavik and after that people here began warming their houses with it. It was important for the inhabitants, as the cost of heating had been high before. The atmosphere in the city changed greatly to the better now that people no longer needed to burn coal and oil to heat their homes.

The most famous hot spring in Iceland is called Geysir, from which the word geyser traces its origin. Cold water on the other hand we get from ground water, springs and rivers. In many of the bigger rivers there are large waterfalls, some of which have been used to produce electricity. We have many natural resources in our country, both hot water from the ground as well as clean cold water. These

natural resources need to be preserved, and the best way to do that is to teach our children about their importance.

Water and the world

The final part of this project took place in April, May and June. We wanted to bring together the world around us and the world of the children at the Furuborg preschool. The goal was to introduce to the children the situation and lives of people living both in warm and cold countries. We also wanted them to learn about the different situation people from various cultures have concerning water, agriculture, clothes, employment and homes.

The first plan was to select one cold and one warm country to compare, but we decided against it, due to the young age of the children involved. Instead we decided to inform them in general about cold and warm countries. A globe, pictures and videos were used in this part of the project. The countries around the equator, where it's warm all year round, we called warm countries, countries further from it were called cold countries.

Iceland has four seasons, while in warmer countries the year is divided into a rain and a dry season. In some places it rains very little and therefore all the water that is available must be utilised very effectively. When we were talking about these different countries the children were reminded of the many difficulties we encountered the day we had no water at the preschool. In some countries animal life is much more varied than here, countries where animals like monkeys, lions, elephants and various bugs live. The dangers and difficulties there stem from a different source from what we are familiar with here. Many children get limited schooling, and many have to work much at home, doing such work as carrying water over long distances from a well.

The children at the preschool did a large model of a warm country with small straw huts, black people carrying water jars on their heads, as well as various animals such as lions and elephants. Of course, the entire country was covered in sand.

In connection with this two black men came to visit us. They guided the children in playing drums, dancing and singing in the tradition of their home country. They were dressed in clothes from their home country and wore their hair in many braids. Finally they

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painted their faces as well as the children's with great skill. At first the children were very serious and shy, but after a while they got into the feel of it and partook in the dancing and drumming. The atmosphere reached a climax when the rain-dance was danced.

The countries furthest away from the equator we often call cold countries. In these countries the summer is as a rule very short with long winters in between. There are to be found huge glaciers and ice along the coast. The inhabitants of these cold countries we call Eskimos, while they call themselves Inuit which in their language means man. Their countries are difficult to live in and sparsely populated. When winter comes the ocean freezes up, and the country and the ocean about it are covered with ice and snow. Inuits learned how to get along, using dogs to help them, which was their only domestic animal. There are not as many and varied animals in such cold countries as in the warm ones, yet it is more than one would expect under such harsh conditions. For example reindeer, polar-bears, seals, foxes and snow-hares, plus a number of birds.

The lack of water does not plague the inhabitants of cold countries as it does those of warmer ones. But that does not mean that everywhere there is plenty of water, in some places people need to melt ice to get drinking water. People in the north get most of their food from the ocean, rivers and lakes, though they also hunt birds. They eat reindeer, as well as using their skin and fur, and that of seals, for clothing.

The children made a model of a cold country that was covered with snow, with only a few patches of green here and there. In their cold country there were snow-houses, dog-sleds, polar-bears and walruses.

A visit by women from Greenland in their pearlsown national dress will long be remembered by the children. The women sang for the children in their unique high pitched tone, and the children happily sang along.

The qualities of life are distributed unequally amongst the people of earth, but the foundation of all life is water, whether we live in a warm or could country.

Our brook

In connection with the water project we decided to take a small piece of land in the vicinity of the preschool, where a brook ran through, into our care. We visited this brook on regular basis and kept an eye on it. We wanted to sense the nature and get a feel for the various seasons and the changing colours of the land.

Sailing in the brook

Every fourteenth day the brook was visited, from fall and well into the next summer. We kept a diary over all our visits. At first the place was messy with plastic bags, trash and barbed wire lying about the place. We decided to clean it up and remove all the trash. The next time we visited it, it was cold and the brook had frozen. It was fun to slide on the ice and to look through it to see if there was anything living underneath it.

The brook was also visited when there was snow outside. Two children fell into it, something helpful to experience when you're young. Often boots and gloves got wet and then it was good to come back to the warm comfort of the preschool to dry them. When spring came and nature was coming to live again with all its colours, a duck pair made themselves a nest by the brook much to the pleasure of the children. They were convinced that the good care they had taken of

the area had made the ducks choose this place to stay. The family of ducks grew in numbers that spring and the children came and fed bread crumbs to them.

Playing by the brook was very enjoyable for the children and taught them much they had not known before. They got to know their environment better, found places where they could play and items in the nature to play with. They learned how to get across the brook by jumping between small rocks, and they learned about the dangers around such a brook. Their eyes were opened to the beauty of nature and they experienced the influence weather has on the environment. Their vocabulary increased and they better understood many concepts related to nature.

Epilogue

The year 1990–91 was memorable both to the children and the grown ups at the preschool. The children worked on their projects with great enthusiasm. The various experiments have encouraged the children to seek information and experiment on their own. The project was done with it in mind to enlighten their interests and encourage them to use their senses. Their vocabulary, understanding of concepts, thinking, memory, creativity and concentration has increased. They experienced things together and got into a greater touch with nature that livened their imagination. The preschool teachers were instructors who encouraged the children to seek their own answers and aided them when needed. Having completed this project we are convinced that the children are more aware of the environment than before, that will come in good use in the future in how they treat nature and natural resources.

THE BEST WAY FOR THE CHILD TO LEARN IS BY DOING

Päivi Romppainen

A few years ago Västerskog Day Nursery did a complete somersault when it launched an experiment aiming to stress the role of nature and natural science in early education along with the voluntary exploration and testing of the environment by the child. The adult concentrates on listening to the child and on providing answers as required; as a rule the adult and the child set out to find the answer together. The child is allowed to feel, to observe, to experience and to discover of his own accord. The children are very enthusiastic about this and it is ages since they have said, "Oh not that again!" at the day nursery. Instead they are all shouting, "Me too!".

The day nursery at Västerskog, a country area not far from Helsinki in Southern Finland, is on the edge of a forest. The red wooden building and big, fenced yard are in themselves part of surrounding nature. Natural science therefore seemed the obvious area on which to focus, since nature has always been an integral part of life at the day nursery.

Finland has two official languages, Finnish (spoken by the vast majority) and Swedish (spoken by a small minority). Almost all the Swedish speakers live in the coastal zone, and because Västerskog is in this zone, the day nursery caters for speakers of both languages: twenty Finnish speaking children and twenty Swedish speaking children with a staff of ten.

Old model scrapped

Nature and natural science were chosen as the focal area for the day nursery when the time came to develop its activities and working methods, the idea being to get away from the adult-led community. Scrapping the old system and adopting a new way of thinking nevertheless caused a lot of extra work for the staff, which had been

trained according to the old system. Experience over a long period of time had, however, proved that an adult orientation cannot be the right one in working with children. The staff accordingly plucked up the courage to try something new. And although the new approach and the new way of setting about their work to begin with left them feeling poorly qualified for the job, they were nevertheless helped by their motivation to learn.

Gone are the days when the staff just took out a ready plan from a folder. Instead, their time is spent just listening to what the children ask and want to know. Then the adults and children together start finding out about the subject. The staff also have to think up ways of presenting the subject matter in a way the children will find interesting and be able to understand. This calls for a lot extra effort, observing and reading up for themselves. On the other hand, listening to the children in a new way is also far more rewarding for the staff.

Children working on a snow construction

Joint effort

The new attitude to work has placed considerable pressure on the entire staff, but the work community has stood up well to the change. The children have suffered least of all.

The old teaching model was invariably greeted with cries of "Oh not again!". Now the children watch what the others are doing and are eager to join in. In fact, they are eager to do whatever is suggested. This stimulates the whole community and supports the theory that the staff really are working with the children in the right way. The school-like atmosphere has gone; the learning event is not dictated from above by the teacher but instead springs from what the children are doing. The staff listen to the children and their ideas.
In autumn and spring the nursery concentrates on exploring nature out in the fields and forests. In winter more time is spent in the school laboratory. The children have their own folders in which they record what they have done.
There are no strict timetables at the nursery. Instead, a meeting is held each week at which the staff go over the subjects that have been raised by the children and that interest the children at that particular moment. The staff then think up ways of working on this material.

More time now
Now that the staff are no longer tied to the old action sessions, there seems to be more time. Yet nothing has been cut out.

The present model is flexible. Because the activities are done in small groups, it is easy to begin as soon as the first children arrive in the morning. Before, nothing really happened until all the children had arrived and had their morning meal. Now the whole morning can be actively used instead of just one short session.

In principle the children have the right to decide whether or not they want to join in whatever is going on. Over the long term the adults must, however, see that no child is always opting out and think up ways to get that child involved.

Although the day nursery has a nature orientation, it does not concentrate on nature to the exclusion of all else. Mathematics can be studied in nature just as well as anywhere else. In our case it is not, however, taught in a lesson with a single mathematical objective but is naturally integrated with whatever else is happening at that moment.

The staff feel that their long working experience has given them the courage to take up the new challenge. They know what the rudiments of mathematics and teaching of the vernacular mean in

practice and do not therefore need to debate whether or not these should be included.

To begin with the parents were a little sceptical about the new course taken by the day nursery. They were afraid their children would not learn anything if there was nothing in the nature of a school. Any such doubts have since been dispelled; the system works and has won the approval of the parents, who report that their children are far more interested in various subjects and are even teaching them new things. Some of the parents were also horrified to find that their day nursery child sometimes knew more than they did. And all the parents have been surprised at how much their children know about nature.

Fact via fiction

Stories are often used as a medium for studying something. A story is a useful medium for explaining something to a child, and it also brings the subject alive.

Västerskog has its own Forest Troll story that has been told at the nursery for more than a decade. The Forest Troll is a benevolent spirit and protects the forest. And indeed, the forest has always been important to the children at this day nursery [the very name Västerskog means West Forest]. Weekly excursions are made into the forest, and there is a special place deep in the forest which the children visit and which is called the Troll's Den.

The adult leading the excursion has a tentative plan for what they will do in the forest, but it is by no means always put into practice. If the children get interested in something else, the plan is shelved and the adult concentrates on the children's questions. Otherwise they begin to study nature through play.

The children might, for example, get interested in an ant hill. Once the children tested what happened when they placed breadcrumbs or sugar on the hill. They also dropped a paper handkerchief onto the hill to see what would happen, and sniffed the formic acid which the ants squirted onto it.

All the children have little notebooks for checking things as necessary. If they cannot find the answer to a problem in their notebooks, they can consult the books the teacher has brought along.

After this short educational session, the children are free to play on their own and eat their sandwiches.

Child and adult equals

During the few years since the experiment began, the adults have noticed a clear development in the children, themselves and the whole working community. The children have definitely become more inquisitive, and it can even be said that they are better equipped to express their thoughts in words than they were before. They are able to describe in detail what they see and experience and are only too happy to tell anyone who will listen.

The adults do not need to be ashamed to admit that they do not know the answer to a nature question, because they can then consult the books with the children to find the answer. This places the adults and the children on an equal footing, as it were, and this encourages the children. They no longer expect the adult to be able to tell them the name of, say, a creepy-crawly they have found; instead, they examine it and turn the pages in the book until they find it.

To begin with the staff found it difficult to keep quiet, not to say the right answer. It is easier to explain like a teacher than to listen to the children and let them find out the answer for themselves.

Adult education

The process has also been an education for the adults in the working community. They have learnt to listen better not only to the children but to one another as well, and to develop a true interest in the others' opinions. The members of staff find they are discussing things more than they used to, and contemplating just as the children do.

Nature has set the whole day nursery growing and developing.

Nature and natural science part of early education

The Västerskog Day Nursery has set out to stress the role of nature and natural science in early education along with the spontaneous exploration and testing of the environment by the child. Nature and natural phenomena as a whole and their observation during the different seasons of the year are the red (or green) line running right through the day nursery's education.

The idea is for the children themselves to become aware of the diversity of nature and to ask questions. The adults act as listeners and the providers of answers, or else the answers are sought together. The adults merely act as passive providers of stimuli but can if necessary become active in helping the children with their scientific studies.

The methods of science teaching can just as well be used in other subjects. Spontaneous questioning, classifying, examining and adopting a critical attitude are not confined to nature and natural phenomena only.

Science teaching works on the principle that the child is a natural scientist: testing, questioning, examining and observing. The problems addressed may either be chosen by the child him/herself or be given by the teacher. The aim of science teaching is for the child to learn by doing, not by assimilating knowledge imposed from outside.

There are a number of stages in the research process. First the scientist must formulate a hypothesis and question. He then makes observations, experiments and comparisons. Finally he decides whether or not the hypothesis was correct or discovers an answer to his question. While making their investigations, the children also practise taking notes.

The objectives are:

- for the child to "merge" as part of nature
- for the child to learn to observe nature for himself: to form an emotional bond with the environment
- to ensure the child a variety of ways of encountering the environment and constructing a worldview; the emphasis is on recognising, observing, experiencing and comprehending
- to give the child an opportunity to move about in nature and to learn to see it as safe, interesting and exciting
- to equip the child to establish a conserving attitude to nature and an equitable way of life
- to instil in the child a sense of the interaction between man and nature and the impact of man on the environment
- to instil nature-friendly habits in the child
- to reinforce the child's self-concept

- to offer the child pleasant experiences in his own environment, to find joy without material goods
- to learn the simple laws of nature
- to teach the child to take an open attitude to new facts and fact finding, by asking, testing and assessing
- to instil in the child a respect for nature, a lifelong appreciation of the beauty of nature

The substance of the teaching consists of:
- the diversity of the world around us
- the conditions for life
- the characteristics of living nature
- organisms and the environment
- the way the earth functions
- scientific experiments (physics, chemistry)

The activities consist of free observation according to the situation on hand, the emphasis being on individual guidance of the child.

The activities take the form of:
- various kinds of play
- work: cooking, growing things, raking, tidying up, etc.
- outings: in nature, to a museum, a science centre
- outdoor investigations: collecting, drawing, photographing
- in the laboratory: chemistry and physics experiments
- expression: stories, narratives, drawing, modelling, drama, music
- festivals: harvest festival, annual festivals

LEARNING ABOUT DIFFERENT ASPECTS OF THE WORLD AROUND US IN A THEME OF NATURE

Professor Ingrid Pramling Samuelsson &
Ph. D. Stud. Ann-Charlotte Mårdsjö

In Sweden the organization of the work in preschool (day-care and kindergarten) in themes has always been and still is the heart of education for young children. In this chapter we will not only describe a theme carried out with children in preschool from the area of nature, but also describe how other aspects of learning are integrated in a meaningful context in this theme. The theme is "the ecological cycle" and the integrated aspects are reading, writing, arithmetic, social science and children's own learning.

Documents from the 19th century tell us that there has always been the ambition in preschool to transfer knowledge to children (like facts about the body, seasons, colours and forms, etc.) and that plans of content were developed for the whole year although this wasn't organized in themes. Fröbel's niece, Henriette Schrader-Breymann became the founder of organizing the work in kindergarten around specific content with her so called "Monategegenstand" where the intention was that children under a longer time should learn to concentrate on a topic of interest. In Sweden the above approach was developed by Elsa Köhler and became called "centre of interest" (Johansson, 1992; Doverborg & Pramling, 1987).

The epistemological base in the approach to learning presented here is that *how children experience* (understand, distinguish, see) *different aspects of the world around them is considered to be more basic than skills and knowledge.* This means that knowledge and skills originate from experience and that the focus of the preschool ought to be on this experience. From this particular view of learning principles are developed for the teacher to use when applying this approach in practice. It is a *metacognitive approach* to learning in

young ages (Doverborg & Pramling, 1995; Pramling Samuelsson & Mårdsjö, 1997).

Research has shown that children who participated in the *experience oriented approach* developed both cognitively (their understanding of meaning) and metacognitively (their understanding of their own learning) to a larger extent than children in the same age range, who came from more traditional programmes. The research as such will not be presented here however, (see instead Pramling, 1990; Pramling, 1994; Pramling, 1996). The main focus of this chapter will rather be on illustrations of the practical work with children related to the intentions of the teacher in terms of what content (understanding) she wants children to develop.

An important task for preschool is to support the children's development in trusting their own ideas and reasoning as children's own conceptions or how they experience something is more important for knowledge formation than is trusting what a teacher tells them. Further significant for children's learning is that we as teachers consider learning as an *individual* task, as a question of *constituting meaning* about different aspects of the world. Of course there exists *collective knowledge*, but this is beyond the single individual's knowledge and making this collective knowledge a knowledge of the individual means harmonizing between the child's conception of the knowledge content and the collective body. To reach harmony – to change the child's understanding – implies a *communication* between the child and the world around him or her.

That children develop an understanding of different aspects of nature and an approach to learning where every child can trust his or her own thinking is important for participating in a democratic process in a society (Bäckström, 1993). This is perhaps the most basic learning to provide in early life.

An experience oriented approach to learning

The principles for an education of young children which will be described below are based on an experience oriented approach to learning (see e.g. Marton & Booth, 1997; Pramling, 1996). The main focus is on the interaction between the teachers' intentions of helping children to develop an understanding of different and specific aspects of the world around them and every individual

child's way of thinking. The principles used by the teachers are: 1) to get children to think, reflect and express themselves verbally and in other ways, and 2) to use the diverse ideas of children as a content in the learning situation. Both for getting the individual child to think and verbalize his or her thinking and for utilizing the diversity, the teacher must create situations (tasks, play situations, questions, excursions, reading a story, solving problems, etc.) around which children can develop the kind of understanding the teacher intends. A competent teacher is also sensible and able to catch situations in every day life where the phenomena dealt with can become a visible starting point for thinking and communication.

To let children verbalize their own conceptions is essential in this method of work, but there are plenty of other ways to form conceptions. Ways that are equally important and that we obviously must make good use of. It is important to use different forms of expression, e.g. drama, picture and other creative materials, construction materials, music and rhythmics, etc. The general principles, which are the base of an experience oriented approach to learning in preschool, are to look at children's learning in relation to their "life world", which they acquire by their experiences. To be able to learn, in the sense of understanding various phenomena and aspects of the world around themselves, children must be active both in action and in thought. To make children express themselves, frame questions and search for knowledge, implies that children are given qualifications to *learn how to learn.*

In the Swedish pedagogical programme for the preschool (Socialstyrelsen, 1987) and the Curriculum for the comprehensive school (Utbildningsdepartementet, 1994) it says that the teacher should offer children varying and intresting activities, where they are given possibilities to develop their knowledge of themselves and the world around them. One important aspect of content is nature. An aspect where both the preschool and the school are pointing out the importance of making children apprehend, understand, respect and live in harmony with nature, etc.

This chapter is about how a teacher uses nature as a content and at the same time integrates other aspects of contents like reading, writing, mathematics, society and learning into the theme of nature. We will here illustrate how a teacher works to make children think

and reflect upon *what, how and why they are doing different kinds of activities*, by problematizing different aspects of content. Together they search for knowledge. The teacher tries to mediate that the important thing is to think and to share thoughts with one another – not to give the "right" answer.

We have chosen to illustrate how the teacher is using the circulation of foodstuffs in composting to develop the children's ideas about how *human beings and nature are dependent of each other*. At the same time they are given opportunities to further develop their own experiences and conceptions of reading, writing, mathematics, society and their own learning.

To create an understanding of the relations between human beings and nature

To start with we would like to give a short summary of the different parts in a theme carried out at a preschool during a six months period. The teacher had a conscious intention of what it was she wanted the children to develop their conception about, i.e. the relation between the human being and nature. Nevertheless the teacher *started out from the children's own experiences*, their questions and their own curiosity to learn more about the world around them.

One example of how a four year old girl apprehended the word "compost" is described in the following dialogue:

> *The teacher asked the girl: "Where shall we throw the garbage?" The girl answered in an obvious way: "Where the post comes" "Where?" asks the surprised teacher. "Right there, in the post box!" The girl's thought was that the compost must be where the post comes – a logical and obvious way to understand a difficult word.*

As teachers we have to make clear what it is we are talking about and what we are doing. We can never take for granted that children comprehend different events and problems in the same way as we do.

Where does our food come from?

The teacher began the theme by asking the children which their own favourite dish was. They then had to ponder upon what different kinds of groceries they needed in order to prepare the dish. When the

children had drawn or written down a list of the groceries they felt were needed for their respective dishes the teacher asked the children if they knew where the groceries came from. The question may appear banal, but far from all of the children were aware of the origin of different groceries. Many of the children said that the groceries came from the food shop, but had a variety of ideas about how the groceries were produced. The children and the teacher cooperated to prepare all the favourite dishes at different times. While cooking and during the meal they discussed which different groceries they had used in the dishes and where these came from.

Vilgot explores a trash can

What are we throwing in the trash bag?

While the children prepared their favourite dishes they were throwing cartons, tins, leftovers and so on in the trash bag. The teacher drew the children's attention to this matter and asked them the question: What are we throwing in the trash bag? She wanted to make children aware of how they can deal with their garbage in a more environmentally friendly way and at the same time become aware of the fact that the stuff they throw in the trash bag does not disappear, but is only moved somewhere else. The teacher made the children attentive to what they were throwing in the trash bag and what happened with the garbage by letting them consider and reflect upon this matter in their own way. They compared what different kinds of garbage they threw in the trash bag at the preschool and at home. The children turned out the contents of a trash bag onto the floor and studied them carefully to find out what different categories of garbage were there.

What happens to the garbage?

When the children had established the fact that they were throwing a lot of different things in the trash bag, both at preschool and at home, the teacher asked them if they had any idea about where the garbage went after they had thrown the trash bag away. The children pondered upon this matter and came up with different suggestions:

> *Lisa: It is a machine which presses the garbage. You can put the garbage in a compost.*
>
> *Anna: Paper is thrown in a container for paper. The garbage truck collects the garbage and takes it to the "garbage house". When the "garbage house" is full, another garbage truck comes to collect all the garbage, but I don't know where it goes.*
>
> *Elin: A machine is compressing it.*
>
> *Anton: We throw peels in a compost with worms. I wrote an arrow so that you can see that the garbage truck belongs to the garbage house. I painted so that you can see that there is a fire.*
>
> *Adam: The peel is thrown in the "compost of worms." When the "garbage house "is full a man comes and he has*

gloves on. He takes all the tins and washes and paints them and sends them back to the food shop. Then they fill them up again.

What happens with things we throw in nature?

The teacher asked the children what happens when they throw a banana skin on the ground. The children told him that the banana skin turns black and shrinks. Then the teacher asked what happens if they throw a tin in the forest. The children had to ponder upon this problem for a while. Some children thought that it would disappear while someone else answered: "If you throw a tin in the forest it will not disappear, and animals and people can get hurt from tins and other rubbish left in the forest."

To get children to understand that different kinds of garbage differ from each other the teacher urged them to bury some orange peels and a piece of plastic into a flower bed. The children's task then was to examine, at regular intervals, what happened to the peels and the piece of plastic. Some time afterwards the children established the fact that the orange peels are gone but the piece of plastic is just as big as it was when they buried it. By this experiment the teacher wanted to make clear to the children that some garbage disappears quite quickly, while it takes a very long time for other kinds of garbage and that some never disappear.

Simon's favourite find – a "dead's head" in the forest!

What is dead and what is alive?
As a part of the work during the theme, the teacher brought up the question of *what is dead and what is alive in nature*, because she feels the children must require this knowledge to increase their understanding of their own composting. She took the children to the forest to collect different things there, which they then put in a bag each. Back at the preschool the children were asked to sort things into two categories – things that are alive and things that are dead – and to explain why they thought that e.g. the stone, the moss, the bottle, the brown leaf, etc. are dead while the lifeless beetle, the ant, the wasp, the piece of glass, etc. are alive. The teacher gave the children this task because she wanted to find out how they reasoned about what is dead and what is alive in nature. When she knows how they think, she knows how to work to give them the opportunity to further develop their understanding for how to deal with garbage and what happens in composting.

How can we deal with our garbage in a way that is good for nature?
Once again the teacher asked the children to talk about what kinds of garbage they throw away at the preschool and then about if they had any suggestions about how the garbage could be dealt with. Some of the children suggested that they could collect the peels from their daily fruit break and throw them in a special place outdoors. One of the children said that it would be difficult to throw the peels in the soil when there is winter and snow. "What shall we do then?" asked the teacher. "Maybe we could take some soil and find some worms and put the soil and the worms together in a box indoors. Then we can throw our fruit peels into the box every day", says Lisa. The teacher was surprised by her answer and asked her how she knew about this. "I remember when we went to the museum of natural history. There was a box with worms and they told us that the worms are eating leaves and peels, and when they 'do a number two' it becomes soil." Some children were skeptical to this suggestion, but they all agreed to try it out.

The ecological cycle in nature – from garbage to soil
The children have now taken part in different stages of the ecological cycle – from grocery to compost. To help the children understand the process they must be given the possibility of

reflecting on the relations and help to connect the activities done in preschool to what happens outside in society. It is not a question of frightening the children or giving them a feeling of hopelessness in their confrontation with pollution of the environment. It is about creating respect for the resources of the world among the children and making them realize that they can influence the environment in their own surroundings. Children must further become aware of the fact that human beings are dependent on nature. Anna, six years old, expresses such an understanding in her writing about what she has learnt during the year in preschool:

> *Last year we began to talk about what it was like in old times. But now we have changed our minds and talk about how nature needs us and how we need nature. In the very beginning we talked about dinosaurs and the origin of the earth. Everything belongs together.*

To develop ideas about what happens in an ecological cycle

Once the children had apprehended the structure of a specific ecological cycle, the teacher wanted them to transfer their understanding to other ecological systems and asked them to ponder and reflect over this question in small groups. The teacher also tried to make the most out of the daily activities and the children's play, to give the children possibilities to ponder upon different ecological cycles. To develop an understanding of how an ecological cycle works it is important to give children opportunities to reflect over and over again. In the following example we can see how the teacher works with the children to make the compost with worms a subject of reflection. She makes them speculate about what really happens in the compost. The teacher takes nothing for granted – her goal is to make *the invisible* that happens in the compost *visible* to the children. The following conversation came up when the compost was brand new to the children. The teacher asked what they thought there was in the compost:

> *– Worms, leaves, springtails, worms, when they get scared a smelly yellow slime comes from them. There are fruit peels that we have put there. The worms and the "down breakers" works so that it becomes soil.*
>
> *Teacher: What use do you think the worms are?*

– So that we shall get soil and nutrients.

Teacher: What does the worms eat?

– First the "down breakers" eat, then the worms, they eat leaves and fruit peels.

Teacher: How do the worm get nutrition?

– The worms eat leaves and fruit peels and their "number two" is soil that gives nutrients to the soil. For us food is nutrition.

Teacher: How do the worms get hold of the leaves?

– They fall on the ground and the worm pulls them down into the soil. The leaves are dry when they havewilted and then the leaves blows off. The tree gets no nutrition for the leaves that have fallen down.

Teacher: What is the use of the sun?

– The sun gives nutrition, the sun gives vitamins, everybody needs the sun. If there weren't trees, worms and the sun we should not exist either, because the trees give us oxygen. Otherwise we would turn into ice lumps, it would get cold. Nothing could grow and we would get no new nutrition. It would get dark.

In the above conversation the teacher has a deliberate thought – that the children will reflect upon and share their ideas about what happens in the compost. The teacher listens and asks questions to learn about how the children think about the course of events. The reason why she is questioning the children in an early stage of the theme is that later on she wants to *compare* how the children have *developed their ideas* about the compost – to evaluate whether they have learnt or not.

When the children came up with ideas about ecological cycles by themselves, the teacher made the diversity of their ideas visible by letting them tell her about the different parts they have drawn in their ecological cycle and also the order of the course of events in it. She also asked them to describe how they thought and interviewed them, giving them an opportunity to verbalize their own thoughts about what an ecological cycle is and how it works. She wanted, in other words, to avoid any of the children drawing a copy of the

cycle without reflecting about what they were doing, since *she wants each child to develop an understanding of the ecological cycle.*

Each ecological cycle is now pasted on a piece of cardboard and put up on the wall. After a while there is a long row of different cycles. The teacher regularly brings the children together in groups and encourages them to speak about their own ecological cycle. The children listened to each others reasoning and the teacher gave them new demanding questions to reflect upon. The teacher's purpose was to make the children *apprehend* an ecological cycle as not only the compost at their preschool, but something that occurs in *many different* ways in nature, of which their own cycles are models or illustrations.

Mikael drew an ecological cycle which started with a tree with seeds, and then says: "The bird eats the seeds, the bird dies. The cat eats the bird, the cat dies. The fox comes and eats the cat, the fox dies. The worms and the 'down breakers' eat the fox." When Dennis drew his cycle he said that he drew a tree and that: "A squirrel eats the leaves from the tree. A fox eats the squirrel. I draw it from this side to show that he is eating the squirrel. The worms eat dead animals and leave the nutrients in the soil. I bent the arrows to make it go round."

When the teacher asked David what humans need to stay alive, he said that we need nutriment. He continued by telling that we get this from vegetables, e.g. from a tomato, and the tomato gets its nutrition from the sun. He also described how the sun gives heat to both human beings and all plants and made his story even more clear by putting arrows on his drawing to show how human beings and plants get nutrition and heat. Daniel said that what he drew made an ecological cycle "but the soil gets it nutriment from the worm. The leaves get theirs from the soil and the soil gets its from the worm. That makes another cycle!" The teacher asked him what he thought would happen if there were no worms in the cycle. He quickly responded that without worms neither we nor the plants could live.

In the above example the teacher starts by making the children *reflect upon and talk about* what happens in their compost. She lets the children *share their ideas* and continues to further develop their understanding of the circulation in the compost. She wanted the children to *develop their own understanding* of an ecological cycle *by*

thinking about and constructing their own cycles. The children were not to just reproduce a model, but get a deeper understanding of what happens in an ecological cycle. The teacher compared the children's different ideas about an ecological cycle to make them understand that there is a diversity of cycles. She created and made use of ordinary situations to give them opportunities to confront different kinds of ecological cycles, and has used the two main principles earlier described for making the children develop ideas about nature.

Developing children's understanding of their own learning

In every activity, situation and solution of problems, the teacher makes the children attentive to all the different things they have learnt, and that together they have learnt many different things about the same content. To make the children aware of the fact that one can learn more about a content, they search for facts together by making excursions in connection with the theme, e. g. the shop, the farm, the garbage truck, the disposal plant, the museum, etc. Before the visits the children write down the questions they want an answer to, and after the visits *they write and draw in their "books of facts" what they have learnt from their excursion.*

It is important that children understand that whether or not they learn depends on themselves, not the grown-ups. Children will always learn, but maybe not the things the grown-up thinks. If we give the children different problems to deal with and the questions *why* we do different things and *what* we can learn from that, the children will start to reflect upon *their own learning* and begin to develop their understanding of this further. It is also important that the children become aware that everybody learns, even grown-ups. Therefore the teacher often talks about and puts emphasis on the fact that grown-ups are learning new things all the time, just as children do. In as many ways as possible she wants to make the children aware that *learning is a process* that continues one's whole life, and also that one constitutes meaning oneself.

The children's own work during the theme is documented in an album with photos. Thanks to this *documentation* the children can repeat what they have been working with as often as they like, at the same time as their ideas change and new thoughts about the content

appears. They can also, with help from the teacher, see how the theme has developed and changed during their work with it. In this way it becomes clear to the children that "when we prepared my favourite dish I believed flour came when you saw in a tree – I don't believe that any longer, now I believe something else".

The understanding of the phenomenon "to learn" (Pramling, 1983) is not dealt with separately, but becomes a natural part of the ordinary work, related to the theme.

Developing an understanding of reading and writing

The teacher encourages the children to use pictures, symbols and letters in their work, all to the best of their own ability. In all activities the teacher makes use of reading and writing to make the children aware of this content. She wants the children to discover that *they can communicate with each other through pictures and symbols.*

The children make the different letters in clay, paint them and put up the whole alphabet on the wall. While they are working, the teacher and the children talk about how to use the letters. The children say that the letters are used when you write and read. One child says: "You use letters when you talk as well. But you use them in another way when you talk." Another child says: "You must *write what you think*. If you don't tell how you think, nobody can find out what you think."

The children document their own work with the ecological cycle and activities in their "books of facts", manufactured by themselves. They are encouraged to write letters and stories about the content they work on which they send to a hand doll who reads and answers the letters. When the children have questions they don't know an answer to, they try to find a person who knows more about it. They send letters to this person and ask the questions they want answers to. The teacher lets the children make their own notes when they are making different experiments. Both the children and the teacher also make notes about how nature changes depending on the season. They continuously talk about the written language and symbols in relation to the topic they are working on.

Developing an understanding of aspects of society

When working on the above theme one inevitably comes to think about society. But once again we would like to point out that a great number of activities about groceries, garbage, garbage treatments and composting at the preschool don't automatically develop children's understanding of how things happens in society further.

When the children had found out what kind of groceries they need to prepare their favourite dish, they went to the store and bought them. They then got in touch with money, prices and advertising. When the children learnt that the food was bought from a factory they naturally wondered about how the food got there. This gave them a reason to visit a farm, which in many ways was a new experience to the children from the big city.

The teacher connected the activity in the preschool to society and let the children *reflect upon the relation*. When they came to their work with the garbage and garbage disposal, the children got an opportunity to compare what they thought happened to the garbage and how society actually dealt with it. The teacher didn't look for a "right" answer from the children, but wanted them to come up with as many solutions as possible for garbage disposal. Perhaps the children could find out a new way for garbage disposal – that no grown-up had thought about.

Another aspect of society, aside from environmental studies to make children aware of what happens in the process between groceries and composting, concerns helping them to become observant of what happens daily in the world around them. They have to take part in the process to get a chance *to influence their own environment*.

Developing an understanding of aspects of mathematics

Irrespective of the content of a theme there are innumerable possibilities for children to develop their mathematical skills and understanding of mathematical conceptions. Some of the arithmetic tasks the children got during the theme of nature were adjusted to their ability to solve problems and were always given in a situation familiar to children. The teacher's purpose was to bring out the tasks related to the activities and let the children reflect upon how the problems could be solved in various ways. They got the opportunity

to count money when they bought the groceries to their favourite dish. They also measured the ingredients when they prepared the dish. The children drew and wrote, both in letters and figures, what groceries they used and how much they used.

They also wrote down how many dead and living things respectively they had found on their excursion to the forest. The children not only drew and wrote *what* they had buried, but *how many* things they had buried. Every child marked the number the way he or she was able to and this could vary a lot. The teacher's purpose is that the children should develop an understanding for *when* and *how* they can use mathematics and how they can solve arithmetic problems on their own. When the children made their own compost they made notes of *what* and *how much* they threw on the compost. Then they drew what happened, day after day, in their own compost of worms. They illustated with symbols of their own.

Conclusions

Knowledge and skills are based on how people experience or apprehend phenomena in or aspects of the world around them (Pramling, 1994). This means that it is not only the concrete activities in themselves that are at the base of a child's possibility for learning new things and by that developing their awareness, rather, it is *how* a child experiences an activity, a phenomenon, a situation, etc. that forms their understanding of the content. This experience constitutes the understanding with which children conceive a task, solve a problem, ask the questions, etc. that is form our taken for granted perspective. By making the diversity visible to children, they are challenged on both their own way of thinking and reflection and on others ways of thinking as well.

Pretty frequently we as authors hear preschool teachers say: "This is the way we have always been working." Certainly there are competent teachers who have always been listening to children and have brought their thoughts forward in daily life. It is, however, difficult to see one's own way of acting, and even more difficult to see and apprehend one's own perspective since it is taken for granted. These elements form our obvious way of acting in the world around us. We, the authors of this chapter, have both worked with children as preschool teachers before we ended up in the field of research, and

we would like to believe that we have listened to the children, tried to understand how they think and let them give voice to their thoughts. But we have not been using the *metacognitive dimension*, which means to make the children reflect upon their own thoughts of different phenomenon and aspects of the world around them. The content has lived it's own life and the form, the method of work, has never been problematized. Probably we did as many others still do – took for granted that certain activities brought the children to learn certain things. The only way to be aware of one's own taken for granted basis of communication is to listen and think about what children express in their thinking and acting (Doverborg & Pramling, 1993; Doverborg & Pramling, 1996).

To look upon the child as active means, above all, to have faith in the child's own desire and interest in learning. Still the teacher's task is just as important, since it is she or he who lays down the outlines for the work by deciding upon what it is he or she wants the child to develop its awareness about. Most of all it's a question of a deliberate *interaction between the teacher's intentions and the child's own experiences*. By encouraging the active child to follow, support, challenge and share experiences you can both lead and let your self be led, as a grown-up in a child's world of experiences.

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MAKING CHILDREN AWARE OF THE WONDERS OF NATURE

Preschool teacher Liselotte Johansson

Those of us who work with children are of course aware that we are helping to form the decision makers of tomorrow. This means that we are, as adults, responsible for providing the children the best possible foundations and as broad a platform as possible. We many times have feelings of powerlessness in the face of environmental problems which we and the children are confronted by. Such a lot rests upon habits which are so difficult to break.

Recycling, conserving energy and water supplies and joint commuting are examples of things which are beneficial for our planet. These things require a change of life-style. But the strength of habit is, as we all know, great. Yet we must learn new ways of life so that we may teach them to our children. They will be forced to meet and hopefully will also be able to cope with the environmental problems which we only speak about today, for instance holes in the ozone layer and the greenhouse effect.

We owe it to our children to pass on to them as healthy a planet as possible, but we must also give them the strength and the belief that they can change and save the world. We adults must show the children that they can achieve many small but fantastic things together with us for our planet and we have to listen to what they say. We give children power if we listen to and respect their opinions.

> *With nature and the environment as a point of departure for our work with children, we can set the foundations for a good future for tomorrow's adults and their children.*

Nature has been my great inspiration during all my years as an early childhood educator. Seeing a drop of water in a dewcup glistening like a diamond and seeing the white snow lying like a soft downy blanket over the ground, is for me the same as owning a great treasure. This treasure could easily also be looking out over miles

and miles of forest and feeling the scent of wet grass just after a shower of rain, listening to the curlew's drill or the taste of ripe berries.

In my work as educator of young children I have always seen the experience of nature as an important educational activity, where environmental awareness and responsibility can be founded in a positive fashion. The children have also shown that even at an early age they can be fascinated by nature. I have tried to stimulate and strengthen the children's desire of discovery and their wants to see, feel, hear, smell and taste when out in nature. I have done this, in order to generate understanding and respect for the fantastic tapestry of context and interaction in nature and I hope all the children I have met and worked with still have their "eyes of discovery" and their enjoyment of nature. My hope is that I have been successful so the children will fight against the environmental destruction we adults have initiated. Our life-style and culture effect the environment. Therefore my belief is that nature, culture and environment are three equally important questions which should be treated together.

My intention with this chapter is to inspire the discovery of nature and its miracles and treasures, so that we may show the children we meet why we need to be concerned about our planet. However, I also aim to show that nature is an un-exhaustive supply for sensory experiences and motor training as well as a plentiful source of inspiration for work within the aesthetic field. We must not forget the nature which is close by us. Learning to exploit that which is close by us in the generation of the kinds of environmental awareness and environmental thinking which can be elements of life-style.

Environmental training

When we use the word nature in a common sense we mean the animals, plants, woodlands and soil outdoors and close by us. But when we say environment we tend to think directly of environmental damage without first thinking directly about what the word environment actually means. Environment means surroundings, that is, the outer conditions which influence people, plants and animals. If we elect to work with children and nature, a natural environmental training must go hand in hand with other aspects of the work. Above all we adults need to be aware of the things we are already doing in

the way of environmental improvement so that we may lift this up in our work with children.

As educators we must also learn:

- some environmental science – which plants and animals there are in the local environment
- how the local environment looked previously so we may see how the environment has been influenced by human interventions
- how to use the kitchen and kitchen utensils in our work so we may use all our senses and show, in a simple and straightforward way, how natural cycles function
- how to show children how to make things from natural materials
- how normal day to day routines at the school and preschool effect the environment and how we can minimize the negative effects of this as much as possible. For instance by sorting garbage and by using environmentally friendly chemicals.
- how to set a good example

If we can attain the above standards then we will already have gone some way toward providing the children with good environmental training. We adults must first and foremost teach the children to love and respect nature in all its forms, so they may understand why they need to care for it. We must also teach ourselves and our children how to live in harmony with nature so it and we can survive.

> *Remember! What is important is not working with nature as a theme during a one or two week period, but rather working long term on an all year basis.*

Planning from the seasons

If one decides to use nature in work with children, planning from the seasons comes naturally. With our eyes open we can learn to see what happens in nature in our near environment. But the planning of activities must of course also build onto the children's interest and curiosity for the exciting events in nature taking place. We can think about the different traditions associated with the different seasons, take up an old forgotten tradition, or why not start a new and we must not forget to talk with older people. There is much they can teach our youngsters concerning both culture and traditions and how we used nature in previous times in different ways. We can also talk

with the children about what is special for our part of the country and the country as a whole. Make the children aware of where they have their roots and what they should be proud of, for example their dialects.

Together with the children we can become "good discoverers" out in nature. We can allow the children to make a senses diary or a nature diary where they can write, draw and tell about their experiences. They could for instance follow the changing seasons with their senses and then write and draw about what they feel to be characteristic for each of them. What are trees like in spring? What does snow feel like? What does it sound like when you walk on thin ice? The children become more observant in this way and together we can learn how things work and why things happen, whilst they happen? We can more easily see interactions in nature.

Another way of following nature is by following the life of one or two animals from the near environment over a year, writing down observations in a diary. We educators don't need to be experts on the animals in order to do this, rather we extend our knowledge together with the children. We can also decide to write about which plants, flowers, trees, bushes, berries and so on there are around us.

If there are difficulties with getting out into nature proper, you can make a small landscape with small plants and animals on a tray and change the materials in tune with the seasons. When the children then play with the landscape they will have the opportunity to use all their senses.

Using all the senses

There are many ways in which we can help children to learn to discover their senses. For instance:

- By feeling how fantastic it is when the warm summer rain runs down your body
- By looking at the beautiful snowflakes slowly falling and fastening on your mittens
- By hearing the mighty thunder and smelling how wonderful it is in nature after the rains have fallen
- The first ripe strawberries – mmm

The treasures of nature are fantastic! Let us take the time to enjoy them.

We have five senses: hearing, sight, taste, smell and touch. Let the children use them when they are out in nature together.

Nature is one of the few places where children can use all their senses whilst also obtaining complete fine and gross motor training, social rearing and respect for all living things. Nature is also the best place for play in the world. There is always something to discover. The children grow strong and resilient and train their bodies and their balance. Trees, stones, woodlands and the ground give the children the chance to hop, climb and run naturally.

Today more and more people are unfortunately unaccustomed to nature and don't see visits in nature together with children as important and as a natural part of daily life. But in order to discover what nature has to offer us, we need to spend a lot of time outdoors in our near environment. A natural move on top of this is to go one step further and more widely into nature. To the woodlands, the sea or meadow. If we go out with our "eyes of discovery", like children do, we can find fascinating things just by a hole in the ground or a tree.

Working from a tree

You can compare for instance a big and a little tree and see the differences in their crowns, heights and so forth. By also comparing our own or our children's height with that of the tree, we can even see other differences as well.

Creating play where we ask the children to go to the largest tree, the tree with the white trunk and so on gives other experiences. By letting the children feel the trunk with their hand or their cheek they can experience the tree in different ways. For example, that the trunk is warmer on the side facing the sun. When you smell the tree, the sap, the resin and the leaves, you will notice for instance that each type of leaf, and even needles, have their own special scent. Tasting the fresh year's shoots, needles and berries is another exciting experience, as is finding the biggest or the smallest leaf and gathering leaves and sorting them according to their colour, shape or how they feel to the touch. Maybe there are some small insects to look at. In these simple ways we can give the children a multitude of experiences.

Working from a worm

What does a worm look like through a magnifying glass? What does it feel like? How does it move? Does it make a noise when moving across fallen leaves? (it rustles) How does it reproduce? (it mates) What does it eat? (plants) Where does it live? (in the ground) Why do worms come up from underground when it rains? (otherwise they would drown) Which animals live on worms? (birds)

Studying animals in jars with a magnifying glass

The best way of getting an insect or such like into a jar is in the same way as children do, by picking it up. Once the insect or animal is in the jar there is much to look at. How many legs does it have? Where are its eyes? What is its mouth like? How do the wings work? What is its body like? What does it do in the jar? Sleep, eat or hide? Why? However, we must not forget that the point of departure for our work is the children's curiosity, which we adults can help stimulate by our questions and genuine interest.

An example of the simple natural cycles we can show to the children are lice-eaten leaves, lice being eaten by lady-birds and ladybirds being eaten by woodpeckers. Another example is pine cones being eaten by wood-mice which are eaten by owls and another is tree shoots which are eaten by hares which are shot and eaten by humans. If we go backwards along any food chain we will ultimately always arrive at a green plant.

More to collect, sort and talk about in nature

By searching out and examining different objects in nature we can sharpen the children's observational capacities and draw their attention to their senses.

Sight: Find something which is large, something which is small, something blue, something brown, high, low, thorny, smooth, a stump, a stone.

Touch: Find something very wet, something rough, soft, hard.

Hearing: Find something which sounds:

- Low – (for instance by blowing on a leaf or listening to the wind in the tree tops)
- High – throw a stone, hit two sticks against each-other

Taste: What can we eat – pine shoots, blueberries, leaves, juniper berries.

> *It is very important to tell the children what they cannot eat from nature's store, like for instance poisonous mushrooms and berries.*

Smell: What smells nice? What smells bad? Compare the smell of leaves with the dry droppings from a herbivore.

Children exploring the nature

How can we make visits in nature even more exciting

Planning a treasure trail can provide a much appreciated variation on the normal woodland walk. The children can be split into two groups. First one of the groups writes the route to a hidden treasure, which could be fruit, smooth white stones, feathers, shells or some other beautiful natural material, and the second group sets out to find the treasure using the map. Then the groups can change. The second writing the route and the first using their map. This gives all the children a chance to both plan a treasure trail and to be a treasure hunter.

You can also write a letter to the children from a pretend person or an animal which lives in the forest, by the sea or in the park, as if

someone was waiting and hoping that the children would come to visit. This increases the children's desires to go on nature walks even more. It makes it more exciting to think that they might meet whoever it was who had written the letter.

Following a trail of pine cones or stones from the preschool or school out to a particular spot is another variation. In order to make the route to the sight for the visit even more fun, we can sing and play games on the way. Why do we need to walk all the way when we can bound along like the hare, sneak like the fox, lope like a bear and so on. We can even change pace by playing. Who'll be first to the yellow house? Look at these lovely flowers! Go backwards! Go sidewards! Walk with ant-steps!

By letting the children paint their faces and dress up as pretend Indians going out on a buffalo hunt, we can make things even more exciting. When playing Indian the children have to sneak through the nature trail looking after tracks and signs. By letting the children paint themselves and then looking to see who is easiest and who is hardest to see, we can help draw their attention to why animals have different colours and patterns. That they take the colour and pattern which makes them least visible in the environment in which they live and that this helps to protect them.

Children don't do as adults say – they do as adults do

It is important that we adults pass on to the children a happiness in being out in all kinds of weather. As long as we dress appropriately there is no bad weather.

When we are together with the children we can also tell them what we did as children out in nature. How we built dens under the big trees and how exciting it was to see if people could find us. How we sometimes camped down by the lake and how we listened to the waves gently lapping against the shore. How we pretended we had conquered the entire world when we managed to haul ourselves up onto massive rocks and small cliffs. By sharing our own experiences with the children we can help the children to see how fun, instructive and valuable it is to be out in nature.

We have always to remember to give our visits in the outdoors the time they require. How can we manage to see and learn things if we don't stop to reflect over the discoveries we have made! We can stop

and tell funny stories and fantasize about what we have seen and heard. Where does the spider live? In a house? What's the spider called? What's its friend called? Fantasy has no boundaries!

Because the children find it easier to accumulate the messages we wish to communicate if we make comparisons with their own world, there are advantages in making relations to their daily lives. Here are some examples:

- Think about mummy ant and all the children she has – so many more than we teachers have. Do you think she has a lot of bother? What would it be like for her to build an ant hill if the other ants didn't all help out, like we do sometimes when we build things.
- Do you know any children who twitter like baby birds when they are hungry?
- The small animals in the ground, what are they doing? They clean up in nature for us. Just like our cleaners do at school.

If we teach the children to think in these ways, they will soon discover the similarities between animals and humans and will perhaps be better able to then understand that each and everyone one of them are needed in nature in one way or another.

> *Remember! Nature can work without us humans but we cannot work without nature.*

Things to think about when working with environ-mental destruction with groups of young children

When we intend to talk to children about the destruction of the planet, we can take departure from the earth, water, air and sun. Let the children make their own suggestions before breaking them down into different areas like acid rain, refuse, the greenhouse effect, the ozone layer, land erosion and water pollution. These words can seem complex and difficult for children, but they are words which are used in the media on a daily basis and it is important that the children understand their meanings. We must try to explain them in a simple way.

The work can be continued by making a display of all the suggestions made by the children about how we can save the planet. If we then show this to parents, decision makers and other adults, the children will understand that their suggestions are being taken

seriously. Another nice way to continue the work can be by making a drama production with the children.

If we want to teach the children to take responsibility and generate understanding for what is happening in nature because of environmental damage, we adults have to show them that we care and take our responsibility as well, and that we appreciate being able to work together with them on these issues.

There is so much we can do with children which in a simple way can contribute to elevating the children's understandings of simple environmental questions. We can for instance choose an area in nature which we can keep clean and tidy and, by setting up signs when we have cleaned up our area, the children will also be able to show others that they have made an effort. We can also start a collection campaign – and can also sell the things we collect or pass them on to recycling if they can't be sold – things like glass, paper, aluminium cans. Through visiting the local tip or sewage works we can enhance the children's understanding for what happens with all our rubbish and all the water we use.

Last but not least we must think about taking advantage of all the possibilities we have by grasping them when available.

YOU HAVE TO ACT TO MAKE CHANGES

Erik Thalling, Teacher at a Training College for Preschool Teachers. Former Director of Fasangården.

We have caught a snake! Martin and Tommy come rushing round the corner with a radiant look in their faces. "It is a grass snake", Lars comments, "it has yellow spots on the neck". And indeed it is. The exclamations and the eager talking attract the other children. Carefully the grass snake is put into a plastic aquarium which quickly is lined with grass and leaves. The children note that the grass snake smells, but it is in fact very beautiful, and it is smooth and soft to touch. After the initial curiosity has died away, the grass snake – still in its aquarium – is carefully carried back to the woods and set free. Away from the loose hens who consider Fasangården as their domain.

The nature workshop Fasangården[2] started in August 1990 as a project supported by the Fund of the Social Ministry for supporting developmental work in creches, kindergarten and leisure time homes.

A biologue and a psychologist was attached to the project as supervisors. This arrangement formed a basis for a perfect start of a pedagogical work at high level. The experiences from the project period were worked up and gathered in a report and a video.

The following experiences and examples derive from my work at Fasangården from 1990 to 1995.

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[2] Fasangården is an abandoned farm which is owned by the municipality and is open for visits by the day care centres. Each kindergarden comes with a group of 5 or 10 children and visit Fasangården every 6th week together with children from other kindergardens. The school children come on school days and have Fasangården at their disposal during school holidays.

6 kindergartens, 6 leisure time homes and 300 children from family day care are covered by the project.

The farm Fasangården and the surrounding nature

Fasangården is situated at the edge of a wood about 3/4 mile from the town. The view from the garden of Fasangården stretches over fields to the fjord with its coasts.

It takes half an hour for the children to walk to the fjord or the small harbours. There is practically no traffic in that area, Fasangården is therefore not fenced in.

Fasangården has at its disposal one acre of scheduled baroque garden and one acre of former fruit garden which has been allowed to grow into a real tangle. We call this part the cave forest. Wild bushes and trees grow here – trees which are seldom found in the surrounding forest.

What is special about being in nature

The children can easily get away from the sight of the adults and, nevertheless, if they want to they can be near the adults. There is a lot of room, the children find the toys in nature and there is plenty of it. Their motor abilities are put to a test when their boots are stuck in the dewberry, when they have to climb the slope or when the aim is to get as high up in the tree as their courage allows them. In other words they meet the barriers and they can choose to transcend them.

This gives the children who are motor active good possibilities for development without running into the very limited physical framework which characterizes the Danish day care centres indoors as well as outdoors. When children and pedagogues are out in nature they are not disturbed by parents who come to collect their children, by the phone or other small events in the daily life of a day care. It is therefore obvious that the children profit from having a lot of time. A good play time or having a good experience in nature takes time!

To leave the children plenty of time to play and to concentrate is a premise for the children to be absorbed in their doings. Peace to carve with the sheath knife, to cuddle the rabbits and goats and chop and saw wood for the fire. But most of the ample time is spent playing! The children run into the scrub in small groups. They play roles which are often different from those played in the day care. When playing outdoors in the scrub the role of the father has a far higher status. When they go hunting Daddy finds traces from

animals. He builds huts and provides wood for the fire. And he participates together with Mummy and the children in picking edible herbs and berries. Playing in nature gives both small and big surprises. When a child exclaims, "Hey, come and see", the play is forgotten for a while, the playmates hurry up to study the phenomenon discovered. It could be a piece of bark where wood louses are swarming and seeking shelter from the sudden light. Or the children go off into a reverie in the middle of the work of arranging the hut because they have discovered a hungry, begging young bird.

Behind the many examples of the children's experiences of nature lies, however, a consistent pedagogical work.

Nature experiences and pedagogical reflections

Whether the children can benefit from the possibilities created by nature depends totally on the attitudes towards nature of the preschool teacher who spends the time in nature together with the children.

If the preschool teacher is willing to make the most of the pedagogical opportunities which nature gives she can give the children great motoric, emotional and social experiences.

Active boys are often considered troublesome in the day care. In nature exactly these children are considered an asset. Especially the active children often find out how a blown down tree trunk, a steep slope or a ditch can be used. Their ideas and activity inspire many of the more shy children to approach matters from another angle and try possibilities which they would otherwise not have thought of.

In order to succeed it is necessary that the preschool teachers are able to get out of the habits from the day care. She will have to ignore her possible negative view on the active child. She must forget the many and – in the eyes of the children – incomprehensible rules which are laid down by the limited physical frames of the kindergartens. In nature there is room enough and many possibilities for playing. Too much noise is seldom a great problem. Therefore, the adults can use the possibility to lay down simple and understandable rules for the children, as for example "the hospital rule": "It is forbidden to hurt yourself and hurt other people and things" and the rule "It is forbidden to get lost". That rule, however,

is quite superfluous as the children will take care to get home in time. The preschool teacher must give the children the chance to transcend their barriers, which means among other things that they must be dressed in a way so that their clothes are not damaged by getting dirty or worn.

In this connection is appropriate to say that the children have a clear impression of their abilities as to heights and distances. Our worries about the accidents which could happen to the children showed to be groundless. It does, of course, happen that a child has to be helped down from a tree, but there have been no really dangerous situations. During the five years I have been working at Fasangården I have experienced far less accidents than I have experienced at the play grounds of the traditional day care centers. The worst accidents happened when a boy jumped from a tree and scratched his chest so he had to be sewn with two stitches. A boy from a leisure time home cut his hand with an axe so that the gash had to be sewn with three stitches. Two boys had to have a tetanus injection as they were bidden by a mole.

The children of a more careful character get into situations where they meet their extreme margin. However, it turns out that they are capable to cope with the obstacles after all. Especially if the preschool teacher is aware of the need for lending the child a hand.

Pedagogical goals for the work at Fasangården

One of the goals for the work with the children is to make them familiar with both *"The living and non-living nature"*.

The living nature is for example human beings, animals and plants. The non-living nature is the landscape: the fjord, the forest, the weather. Familiarity in this sense is meant as a contrast to alienation and demands knowledgement of both details and entirety of nature. The children's approach to nature must be many-sided, partly to understand nature's many aspects, partly to ensure that as many of the children as possible become interested. It is, therefore, equally important that they become acquainted with the living organism in nature as "the four elements", earth, fire, air and water as well as to the things to do in nature.

The children can build up a confidence in the animals by seeing many different animals in a number of situations in a secure

atmosphere. The children's understanding of animals and nature is very dependent on the reactions of the adults. If they show engagement, joy and interest their positive attitude influences the children. If the adult, however, shows fear or dismay this attitude influences the reactions of the children likewise.

The preschool teacher must be active and take initiatives. She must look for the creepy things under the stones, between the leaves and in the bushes. She must show her enthusiasm both in the way she speaks and by her body language in relation to what she finds – and especially what the children find. The children must be praised when they have found something exciting or have caught an animal. This makes the children happy and proud and it stimulates them to a more goal-directed activity.

Some people are afraid of spiders, others feel insecure by the quick ground beetles and some think that slugs are disgusting. Show the children that you dare touch them. Tell them that they tickle when they move on your hand, comment on the beautiful colours and their exiting form. Put the animals in a glass tray or under a magnifying glass. Let the children look at the animals and find out how they act. Afterwards they can make a "home" of leaves and pieces of bark.

Ask the children if anyone wants to hold them. Choose a child who is likely to stay calm and try to motivate the timid children when they have seen that others find it fun and exciting. Tell them that you are just beside them and that you are ready to take over the insect/animal when they do not want to hold it anymore. If they show courage they should of course be praised.

If the animal gives the preschool teacher the creeps she will have difficulty in making the above experiment. Be honest. When Brian comes with a creepy thing, tell him that you are afraid of getting such a beetle too close. Then you can look at the animal together with him. I have not yet met a normally functioning child who has not respected such an information from an adult.

Preliminary studies of domestic animals

Keeping domestic animals is another way of giving the children a familiar relationship with animals. Because of allergic reactions

with a growing number of children it is most practical to keep birds and mammals outdoors.

It is, however, not always pleasant to be a pet. Though the adults are present when the children are together with the animals accidents cannot be avoided. I have seen a quiet little boy squeeze a rabbit to death while he held it in the lap caressing it. When a girl from a leisure home was putting a rabbit back into its cage it jumped out of her hands and broke its back, it became clear that our rabbits had to be big, heavy and sturdy rabbits.

The hens, however, show in a clear way when they are not satisfied with their treatment. This gives a natural opportunity to have a talk on the treatment of animals. Goats have given us the best experiences. They are wonderful, curious animals, who like to be caressed and fed, but who also back out when it is too much. Keeping domestic animals gives the children an insight into the course of nature. Hens sitting on eggs resulting in chickens. Cute and lovely young rabbits and kids. But also death becomes present, whether it occurs by itself or by slaughtering. The experience of death results in profound and serene conversations on a subject which occupies them, but which is seldom treated.

Many day care centers have aquariums indoors. But what about replacing the tropical fish by natural fish from our own lakes and streams. This does not need heating of the water and it saves in fact the environment from quite a few kilos of carbon dioxide. Furthermore, it reflects life of your local pond or life at the coasts. A shoal of roaches is very beautiful together with leucaspius delineatus or small ruffes. Crucian carps are hard on the plants, but are easily tamed and willingly come to the surface to suck the children's fingers. A few perches in a big aquarium are beautiful and exciting to follow. These fish can easily compete with tropical fish in beauty and elegance. An aquarium with fish living in the waters near the beach is easy to keep. Shrimps, crabs, sticklebacks and freckled gobies are exiting to follow. Let the children help to catch the fish, this makes the care of the aquarium more meaningful to the children.

Meal worms wriggling around in the wheat bran together with meal beetles attract the children's attention. It requires very little work to keep these small insects. They are also suitable as feed for

the perches and are able to pick small craniums in no time. Wood louses are also easy to keep. The most suitable insects, however, to make the children feel comfortable with insects are stick insects. They are lanky and have long legs, but at the same time they move so slowly that the child does not have to be afraid of suddenly finding the animal in her sleeve.

Trees and flowers

Plants are of a quiet character and of no great interest to the children. However, children quickly discover which trees are good for climbing, which are hard to saw or easy to carve. Which trees have flexible branches and are good for making bows and which break for a mere nothing. They know that brambles taste delicious, and that other berries look tempting but do not taste well. The children know dandelions, which are so lovely and numerous so they can make plenty of magnificent garlands.

This is the starting point for awaking the interest for flowers. Dried woodruff gives the most wonderful scent. Ground elder and nettles are thrown on the fire and taste nice in the pancakes together with the raspberry jam.

But the plants can also be used fresh or dried for bouquets, pictures, decorations, toys and games. There are many books with ideas how to use materials from plants – either as food or for decorative purposes.

Man has always depended on the wild plants. Therefore, most of the plants have Danish names. Do not cheat the children out of these names. They appeal to a high degree to the fantasy and the joy of playing with the language. All languages have plants with names which children find amusing to pronounce. But in addition to that useful qualities, legends and myths are connected with many plants. If you know about these qualities and stories you have a pure storehouse at your disposal when you tell the children about the plants.

Projects

Give the excursion to the wood or to the beach a title. This has several advantages. It makes it easier for the teacher to prepare herself, it gives the children time to reflect on the subject and you

can limit the amount of materials you want to bring along. The most important, however, is that the aims for the day are visible to all, both children, parents, and teachers. This also makes it easier for the teacher to evaluate the outing. When there is a title it is easier to formulate an aim for the outing and you have to think of the means to succeed.

A Mushroom Outing

The title of an outing in the autumn could for example be "mushrooms". The aim could be to dedramatize the children's ideas of mushrooms being poisonous. Many Danish children are of the opinion that they may be poisoned by merely touching mushrooms. At any rate mushrooms take much room in our imagination.

It would, of course, be ideal if one of the teachers were a mycologist. In this case the outing can end with eating samples of edible mushrooms. If there is no mycologist among the teachers do not abstain from the outing – only from eating the mushrooms!

The teacher could prepare the children for the outing by flicking over the pages of a book about mushrooms and point out to the children the differences between the most common mushroom species, telling them that some are edible, some are very poisonous, some are suitable for making decorations, while some rot quickly. When we are in the wood we smell at the mushrooms, we discover that some contain a white latex, while others contain a black ink. We notice the great variety of forms and colours, and notice that both snails and mice have eaten some of the mushrooms. Maybe they tolerate the mushrooms, but this is no guarantee that humans do. And by the way we cannot taste if the mushroom is poisonous. Incidentally, only very few are potentially lethal, and it would, therefore, be practical to know these. The teacher can also prepare herself to tell some tales or myths where mushrooms play a role. And what about playing trolls and fairies.

Though the outing has a title and we use this as a red thread through the outing it is important that we are also flexible. We use time to look at the dung beetle which Maria has found, and to look at the woodpecker pecking the cones high up in the trees. But we return to the mushrooms when the children have seen enough. You

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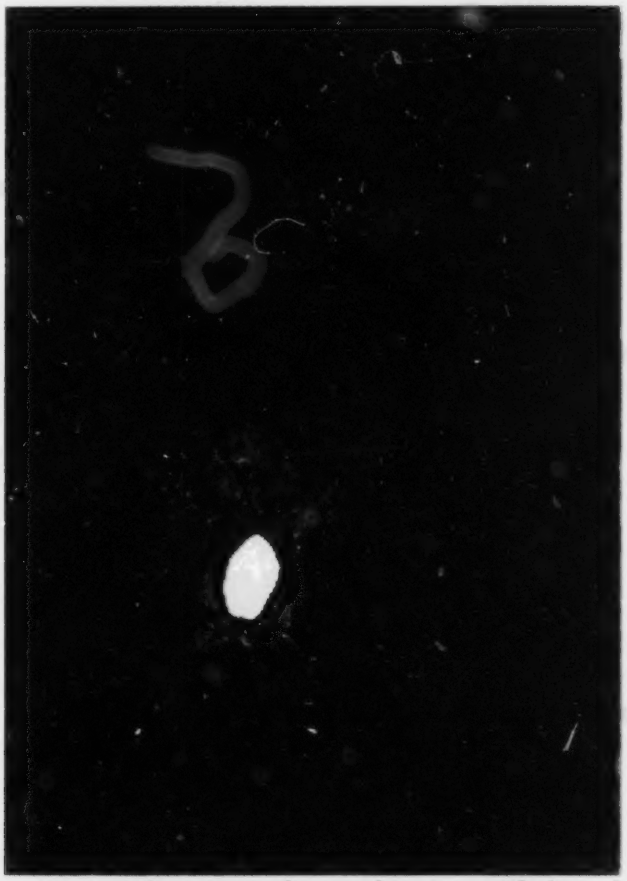
soon find out that children have a sharp eye so that it is more often children who discover things of interest beyond the actual subject of the outing.

But do not forget to give the children the possibility of playing by themselves.



"I don't want people to cut down the trees. If they do, we will all die." (The drawing shows a koala bear who starves since it has to live in a clear-cut area) *Torbjörn, 7 years*

Do children become aware of environment by being in nature?
One of our goals for the children who frequently come to Fasangården is to qualify them to become adults who care for nature and become conscious about preserving nature. If we are

overwhelmed with problems and conflicts it can very easily create indifference and passivity. Our goal should, therefore, be

- to give the children such experiences that it makes them love to be in nature,
- to show them nature's possibilities,
- to inspire respect for all life,

to create a pleasure for the children to be in nature, to show them nature's possibilities and to inspire respect for all life.

Respect for life does not prevent us from any form of killing. We eat dandelion leaves, we weed the vegetable garden, we also sometimes kill insects which we exhibit in the nature workshop. We kill mice who have moved into the kitchen, and we slaughter the redundant domestic animals.

We get an impression of respect for life when we visit the fox's earth and tell each other that this is the fox's home, and *we* are the guests. Therefore, we don't put sticks into the burrow and we walk quietly when near the burrow. We observe the bird in its nest but we disturb it as little as possible. We pick flowers, but not all, and we leave the roots in the earth.

We treat our domestic animals properly, and the slaughtering is done quickly and with consideration.

The question of how to respect life contributes continuously to a discussion and we adjust our actions accordingly.

That animals eat each other violently affects the children. But they learn to accept that the ground beetles eat the earthworm because of starvation and the remaining of the great titmice tell us that the young birds of the sparrow hawk have been satisfied.

The children were however more affected when a woodman suddenly got down from his tractor, ran over the lawn and killed a water vole with a stick when shouting "damned trash". He left the animal lying on the grass and went back to work. The reason was that the woodman was fed up with the hills in the lawn made by the voles. This explanation, however, was not accepted by the children.

Pollution in a child's perspective

When the children are confronted with environment problems we have to indicate a solution where we can act immediately. The wood round the Fasangården clearly carries the stamp of a wood

near to a town. Actually, much rubbish was lying about. We talk about which things crumble and which things remain unchanged in the wood. "Do the earthworms eat this apple core?" sounded the question to the 3–4 years-old. Half of the them answered "yes", the other half "no". Then we talked about this subject. "Do you think the earthworms eat this piece of broken glass?" Now the children had understood what the adult meant, and most of them answered "no". This was correct and moreover the animals might cut themselves. Therefore we make an expedition and remove all the rubbish.

The children quickly found out that most of the rubbish was thrown by the adults. Wine bottles, beer caps and empty cigarette packets. This fact created a solidarity among the children. Since then some parents have complained that when at last they go to the wood with the children they have *God help me* also to bring a plastic bag for all the rubbish which the children find.

The teacher's knowledge of nature

We discover the wonders of nature when we get emotionally touched by experiences. We get caught by the event, we feel excitement, joy or we are overwhelmed. But the more consolidated our knowledge is, the more and better experiences we get.

I have heard from many teachers that they are uncertain about the amount of knowledge they need in order to give children good experiences in nature. Nature is so complex and the need for knowledge is so enormous that some think that you ought to be a qualified biologist. Others go the opposite extreme and think that it is of no importance whether the teacher has any knowledge of plants and animals as long as you are fond of nature.

If you know the difference between the trees and know a little about the growing conditions of each tree you can extract a lot of information on the outing. According to the health standard of the tree you get an insight into the suitability of the soil and the surroundings for exactly these trees. If you know which animals and plants should be living here you are prepared to meet both the usual and the unusual. The picture of the wood becomes much more varied for people with this kind of knowledge that for the person who is only capable of roughly distinguishing between coniferous and deciduous trees.

By this I do not mean that the teacher should not take the children into nature because she has little knowledge of life in nature. But the teacher should aim at qualifying herself bit by bit. The knowledge hereby acquired is not meant as being used as theoretical instruction of the children. It shall give the teacher the background knowledge which enables her to create a free, dramatic, narrative and constructive atmosphere and hereby impart knowledge of nature to the children.

When the teacher has knowledge of and experience from nature she has a better understanding of the consequences for nature of man's presence and activities there. Whatever we do when we are in nature we leave a number of traces, and the traces we leave have influence on other people's use of nature. People who are very fond of being in nature wear nature so much that others may feel that they misuse nature.

As supervisor I meet people who participate in guided nature walks. They want to go into nature but they want to be sure that they do not get lost.

I think it is important that we teach the children about their local nature so that they dare go by their own, when they are permitted to by the adults. This will give them confidence to move further and to more unknown places. Though the children live in a big city the local nature places should therefore be given the highest priority. The well-known and impressive sceneries which require travelling a little further away are a good supplement, and should therefore be considered as such.

The local nature should also be linked to the local history. Associations of local history is often in possession of a very rich material. A lot of this material is very imaginative and exciting and it often tells us how our ancestors lived from and along with nature in old days. And where local history fails we will ask gnomes and trolls for assistance.

As a conclusion: Make use of playing, the imagination and tales when you will communicate the joy about nature. I think that Judith – some day when she finds the great love of her life – will remember the hot day in August when she carefully carrying a toad in her hand said a little disappointed, "It's a quite ordinary toad, I have tried to kiss it".

CHILDREN AND FIRE

Karin Vilien

The children in Denmark can start school when they are six years old. They start in Kindergarten class. The Kindergarten class is not compulsory but 96% of all children attend the class. In the Kindergarten class the children learn through play, problem solving and personal experience. The preschool teacher plan a number themes during the year. The children are not introduced to systematical training in letters and number, but letters and numbers are introduced through games and play.

Working with nature is a part of the curriculum in the Kindergarten class, and the theme "Children and fire" described in the article is one e.g. on how to work with nature.

The class described in the article had 21 children, one preschool teacher and one aid.

Why "children and fire"?

As teacher in a kindergarten class in a large school in a suburb of Copenhagen I ones worked with the theme "Children and Fire". It all" started one day at circle time in the early autumn when the children had just started school. A boy wanted to tell about the midsummer festival he had been to together with his parents. He was telling very dramatically about the fire and how big it had been and how much he liked it and that he would like to make such wonderful fires himself. Many children joined in the conversation because most of them had been to the traditional midsummer festival. In Denmark the longest day, 21 of June, is celebrated with big bonfires and children and adults are singing and playing together. Many children also expressed fear of the fire and told how dangerous it was. They all expressed an enormous interest in fire and at the same time demonstrated that they had no personal experience with bonfires. The children did not know that fire could be transformed into other kinds of energy. That we e.g. would have no hot meals, no

warm water, no central heating if we did not know how to control the fire.

From that conversation in the circle time I decided to take up the theme "fire".

The first plan

The plan:

- The first day, the children should learn how to make a fire and cook tea.
- The second day, the children should bake bread over the open fire.

The first day when the children should learn to make the fire, we went to a small green area called the "mountains" (the "mountains" were about six feet high) which were just outside the school. We made one big bonfire and cooked tea in the kettle that I had used when I was hiking in the "real" mountains myself.

The only ones who really got to work with the fire and to do the cooking were the teachers and we knew to begin with and had all the experiences. It was obvious that we had to change the method, because the children wanted to work directly with the fire, to get the experience and to be so much in control of the fire that they could do the cooking themselves. We had to find a way of organizing the making of the fires so all children could become active.

The new plan

I decided to make a plan for a longer period which included that the children would become so familiar with fires that they could work with different cooking utensils and prepare different dishes from different historical periods. In the last part of the program the children should be introduced to the small steam engine, which the physics teacher promised to demonstrate for us and to visit a power plant.

The name of the theme became: *"How man domesticated the fire."* The plan was to work one day every week for nine weeks with the project.

The headline for each workday was:

- How to make a bonfire.
- Flouer and bread in the Iron Age.

- Meat and soup in the Iron Age.
- Fish and porridge.
- Cowboys on the Prairie.
- Kitchen range and stoves, visit to an old farmhouse.
- The steam engine.
- Electricity, visit to a power plant.
- Parents and siblings were invited to a party.

The school was situated near a green area, part of which was Moreland. On the Moreland the municipality had a historic workshop where older school children had practical history lessons referring to the Iron age, here it was allowed to have open fires. The class vent to that place every week, here they had firewood and an open shed where the children could work in case of rain.

How children worked with bonfires

We had to developed a method, that gave all children the possibility to work directly with fire and it had to be a safe method.

We divided the children into groups of three, and gave the following instruction:

- Make three balls of crumbled up newspaper.

- Go and collect a lot of firewood from the smallest pieces to big pieces.
- Put the smallest pieces on top of the newspaper balls.
- Each child can strike a match and light one newspaper ball.
- One child has to stay by the fire all the time and two can go and collect wood.

The most important rule: we control the fire, the fire is only where we want it to be.

It worked perfectly, within 15 minutes we had seven bonfires. Each group lined up in front of their bonfire and repeated the rules. The children followed the rules all day, there was no arguing, no discipline problems and the children were so proud of themselves. Now the children had the basic knowledge about how to work with fire and knew how to behave.

General working method

In connection with the working days at the historic workshop we discussed with the children what they already knew about the subject or what they imagined or believed. We went to the library, told stories, made pictures and put them on the wall. While working on the grounds we took a lot of pictures as documentation. After the practical work we evaluated the day and talked about what was different from what we had imagined and we planned the next working day.

In the following I am just describing the practical work.

Flour and bread in the Iron Age

The aim for the day was to bake bread on hot stones. The children were divided into the same groups of three as they were the last time. The same groups stayed all through the project. One child in each group started to grind flour and discovered that it took very long time and that it was hard work even if they took it in turns. While one child was grinding the others were looking after the fire. The children became very happy when they after a while got all the flour they needed from a bag bought at the near by shop. The teacher helped each group to put one big stone into the fire on which they later could bake a lot of small round flat bread.

We had decided that no one was going to eat before all had finished and we all could gather together for a meal. Some children were very fast workers and had finished their bread long time before the rest of the children. These children had to look after their own fire and at the same time beat cream with birch twigs until it became butter. Finally all the bread was ready and the butter was ready and we all gathered to eat the food we had made and to talk about how much work everybody had done in order to get bread enough for all of us.

It was a very special day for the children, they had proved that they could work hard, that they knew how to control the fire and that they could produce bread and butter over open fire if they worked together.

Before we left the site the children went back to the fireside a couple of times to make sure that all fires were extinguished.

Meat and soup in the Iron Age

The next time the class went to work with fire, the plan was that the children should work with the fire in exactly the same way as last time, but the should cook something different.

Before we went to work we talked with the children about what else did people eat in the iron age? Through stories, pictures and history books we talked about hunting, and picking "things" in nature that one can eat. In a way it was interesting, but the fire was the most interesting.

Now it became a little more difficult and the children had to listen to instructions and to organize the fireplace before they started the fire. They should cook the soup in a clay pot, this can be done if you do it the right way, and follow the rules.

The clay pot had to be turned so it didn't get too hot on one side. Because if that happened the pot would break and the soup would extinguish the fire, that would also happen if the pot turned over. To do that while the fire was burning they needed leather gloves. They had to make sure that the pot was standing really safe on top of three stones and could not turn over.

Then the children had to come with the teachers in order to find the right kind of plants to put in the soup.

Because the fire was the most interesting part of the theme everybody remembered how to build the fire and to light it. Within ten minutes we had all the fires going.
Then each group got their materials:
- a cooking pot made of clay,
- meat (something like spare ribs),
- stinging nettles and leaves from dandelion and gout weed. (which they had to pick themselves),
- two pair of heavy gloves.

The children looked after the fires, turned the pots, picked the leaves and cooked the soup. Later we gave them salt to put in the soup.

As teachers we had nothing else to do but to talk to the children and sit around the fire, the children were eagerly occupied with their work. We had plenty of time to tell the story about how the Danes later in history became rich because they had salt to sell and that it was the only spice apart from the leaves that people had at that time. (One pot turned over and we had to help the children to get started again.)

All children agreed that it was the best soup they ever had in their whole life.

Fish and porridge

For the third time the children had to work in their groups and to light the fires. This time we focused on porridge because we had been talking about how the lifestyle changed when the people became farmers, and how the kind of food they ate changed at the same time.

The children needed much fewer instructions, but we kept reminding them about the rules:
- how to control the fire – how to build the fireplace – how to cook in a clay pot – how to extinguish the fire

They got the materials:
- grain for the porridge
- apples
- honey
- clay pots
- gloves

- newspaper
- matches

The teachers wanted to have their own fire going together with the children and they wanted to cook fish in the open fire.

The children had to cook the grain in water and to stir in it, without turning over the pot, not to burn themselves and to do it without getting too much smoke in their eyes and at the same time remember to turn the pot. They had to peel and cut the apples and to sweeten the porridge with honey. (The historical workshop kept bees.) The children had no problems keeping the fire going, but it was not so easy to cook the porridge. But they all made it with some help.

The fishes were stuffed with wild cress and wrapped in big leaves and cooked directly in the fire. The children liked the bread and the soup the best.

Cowboys on the prairie

The children said that they knew everything about cowboys. But when we asked them what did the cowboys eat when they were travelling on the prairie and how did they prepare the food? The children did not know. The children knew that the cowboys slept around the fire during the night, but they did not know how the cowboys made their bedrolls.

This time we gave the children the materials and asked them to discuss how they were used and what fore. All the things were so much like what the children already knew about. Each group of children got:

- a kettle
- a frying pan
- a tin of beans
- bacon
- tea and sugar

Each group had to build a double fireplace with room for the frying pan and the kettle.

It took no time to fry the meat, add the beans and boil water for tea, it was a very short program. Beans are not exactly what Danish children like the most. The rest of the day was occupied by playing

cowboys and Indians. Some children came and learned how to make bedrolls because they needed to know it as a part of there play.

The last part of the theme had very little active participation for the children, but it included two field trips and field trips are an important way for children to learn not only what is connected to the theme but also how to get around, to look after oneself and the other children, how to behave in public places and to concentrate on the theme in strange and new surroundings.

Field trip to an old farmhouse, with kitchen range and stoves

Outside the city, not too far away from the school was a tea garden run by an old woman, her name is Lisbeth. She offers tea, coffee, hot chocolate and home baked cakes. She heated her house by stoves and cooked on a kitchen range. To get to Lisbeth's farmhouse the children had to go by train not more than 10 minutes, but then they had to walk five kilometres. For six year old children who live a suburban life, five kilometres is a long way. We trained by taking the children for shorter walks and when the day came all children felt that to day they had to set out to conquer the world. They all had a back pack with food and something to drink, a raincoat and heavy shoes. (Don't go any where in Denmark without a raincoat.) Finally at the farmhouse the children got hot chocolate and home baked cake cooked on the kitchen range. They had the kitchen range demonstrated and they tried to collect wood for the stove and to put the wood into the stove. The children were tired from the long walk and the hot chocolate and while we were waiting for the bus to take us back to the station in order not to walk the five kilometres back one child uttered almost to herself: "I just can not see how you can celebrate Christmas here".

This very different way of life made a big impression on the children and in a way they felt very sorry for Lisbeth and on the other hand they admired her large house, the fields and all her shop. We got a lot of raw wool to take back to the school and we promised the children to make thread and felt from the wool later that winter.

The steam engine, or how the fire was put to work instead of man

The physics teacher invited the children to the physics classroom to demonstrate the steam engine and to tell the story of the invention of the engine and about the first steam trains. The truth is, very few children were interested in the steam engine. Some boys were interested in the possibility of the engine blowing up. The kind of knowledge they got could not be related to their experiences and they could not use the information they got. The teachers decided to end the lesson and to go on with other activities.

Electricity, visit to a power plant

In the harbour of Copenhagen is one of the city's oldest power plants situated. In the old power plant you can still see the huge engines that produce the electricity. The children were standing on a balcony 25 meters above the floor looking down on the green painted huge engines with shining brass safety valves on top. It was a little difficult to imagine that the engines produced electricity and made it possible for us to cook on the electric stove in the kitchen at home.

The children were surprised that the engines did for us today the same as we had done when we cooked on our own fires. Afterwards we went and saw the big ships in the harbour and went back to the school by train.

Evaluation

The children liked the part with fire and hard work the best. They could remember all the instructions, and they could tell how people lived in the iron age and they remembered very well what the cowboys were eating and how they cooked the food and folded the bedrolls.

They could not remember anything about the steam engine apart from the possibility of the engine blowing up. They could remember the big engines at the power plant and with a little help they remembered that with out the engines we could not cook food in our homes.

At the evaluation the children wanted to show their parents all that they had learnt. We decided to invite the parents and sisters and brothers to a party to show them how to work with the fire and to

serve them a meal. By the time we finished the theme it was almost Christmas and the children agreed that the party should be in the spring right before the summer vacation.

The party

At circle time the children and the teachers discussed the invitation and the plan for the party for parents, sisters and brothers. The children were sure that we would be at least 100 people for the party (it turned out to be 75) and that it would be a really hard job to cook for so many people. The following plan was made:

All children would stay three days at the historical workshop in tents and use the first day to prepare for the party. Then we had time to buy the food, building all the fireplaces and gather wood in order to be ready for cooking the next day. Everybody was up early and started all the fires.

The menu:

- soup with meat and green leaves picked from the area
- baked potatoes
- bread with home-made butter and honey
- chicken fried on the open fire

The parents brought salad, soft drinks and cakes for dessert.

During the long day the children worked for a while and then went away to play. When they had had a small break they came back an went on with the cooking. The teacher had enough children to work all the time. At six o'clock all the guests came, and the children very proudly introduced the food and the plan for the evening.

We had luck, it became the most wonderful evening with sunshine and warm weather (in summertime the sun goes down at 10 o'clock in the evening). Children and parents sat around the fires and talked and the children were playing in the dark, until they became tired and went to bed in their tents. The parents went home, they all lived near by and the next morning a Saturday some of the parents came back and helped us to take down the tents and clear the grounds. Parents and children were talking about that wonderful evening for years.

The theme became very special, the children felt that they had learned to control the fire, to cook many different dishes, to walk

five kilometres, they became much more independent and self confident through the work with the theme. The parents were surprised to learn how good their children were and how many things they could do on their own.

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Karin Vilien is Private consultant in early childhood education mag. art. in Denmark. She is educated as preschool teacher and public school teacher. For many years Karin Vilien worked with further education for preschool teachers at the Royal Danish School of Educational Studies, teaching learning theory and methods in developmental work. Karin was also the chairperson of the Danish OMEP group for many years.

This book "Our World?" focuses questions about the child's right to live in and learn about an ecologically sustainable world.

Questions concerning this topic are very important in early childhood education. The attitudes to the environment and to human rights are influenced very early in life. OMEP hopes that this publication can help young children's teachers to get knowledge about and inspiration to work on all levels in each country with these questions.

This book is written by colleagues from Denmark, Finland, Iceland, Norway and Sweden as a joint project, just as OMEP's 50th anniversary and 22nd World Congress in Copenhangen is. Lärarförbundet (The Teachers Union) in Sweden contributed financially to make this project possible, and to give each of you, participating in the 22nd World Congress of OMEP, a copy.

Editor: Professor Ingrid Pramling Samuelsson

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